
4.0 ENVIRONMENTAL CONSEQUENCES

This section presents an analysis of the impacts that each of the Practical Alternatives for US-131 would have on the natural, social, cultural, and economic environment of the study area. The impacts of the No-Build Alternative are compared with those of the Build Alternatives that call for construction utilizing existing and/or new right-of-way (ROW). New roadway construction would potentially impact existing residences, businesses, farmland, and natural features. As discussed in **Section 2.0, Alternatives Considered**, six Practical Build Alternatives (PA-1 through PA-5 and PA-5 MOD) and the No-Build Alternative are being considered in this document. The Practical Build Alternatives are displayed on the map in **Appendix E** at the back of this document. This map should be folded out for reference while reading the text. PA-5 and PA-5 MOD are non-freeway Build Alternatives with a variety of roadway cross-sections. This detail is further depicted in **Figure 2.3 (sheets 1 and 2)**. **Figure 4.10 (sheets 1-4)**, found at the end of this chapter, illustrates the location of many of the environmental constraints relative to the Practical Alternatives. Many of the impacts discussed in this section are summarized in **Table 4.22 in Section 4.31, Summary Matrix of Impacts of Practical Build Alternatives**.

The impacts for some resources are further broken down into four segments (A,B,C,D) for each of the Practical Alternatives as presented in this section. These segments are labeled on the map in **Appendix E**. The termini for each segment are at locations where the Practical Alternatives converge so the reader can closely approximate what the impacts for key resources would be if segments of different Practical Alternatives were combined in developing the Recommended Alternative for the Final Environmental Impact Statement (FEIS). Each segment could be joined with other corresponding segments to form a combined alternative, however, some geometric reconfigurations would be required. A summary of key impacts by segment is contained in **Table I** at the back of the **Executive Summary**.

4.1 Land Use Impacts

This section discusses the impact of the Practical Alternatives on existing land uses within the study area and their compatibility with local zoning ordinances and land use plans. The on-existing alignment sections of the Build Alternatives principally impact agricultural, scattered residential, commercial, and industrial land uses, as well as existing roadways. Build Alternatives on new alignments primarily impact farmland and rural residential areas. The freeway alternative utilizing the most on-alignment ROW, PA-2, would have the greatest impact on commercial and industrial land uses. PA-5 and PA-5 MOD follow much of the existing US-131 alignment and would have less impact to land use than would the freeway alternatives because little new ROW would be needed (see **Figure 2.3, sheets 1 & 2**). Build Alternatives with western bypasses around commercial areas have the potential to encourage further growth around interchanges and intersections located west of existing development. However, highway-induced development that is located away from existing commercial areas would likely be very limited along the freeway alternatives. Development would also be limited along the section of PA-5 and PA-5 MOD bypassing the Village of Constantine due to access limitations.

In terms of land acquisition, none of the Build Alternatives would have a substantial impact on land use in the study area, with the exception of PA-2. The total acreage impacted would be a

minimal percentage of the land use within the county for all land use types shown in **Table 4.1**. In the case of PA-2, the roadway would impact almost all of the commercial property within the Village of White Pigeon, substantially affecting the viability of this small commercial area. The acreage of land acquired under PA-5 and PA-5 MOD is substantially lower than with any of the freeway Build Alternatives.

A substantial impact on land use would be the conversion of the majority of the land zoned for a specific use within a particular community or district into ROW. In terms of compatibility with existing zoning and planned land uses, none of the Build Alternatives would have a substantial impact on zoning/land use in the study area, except PA-2, which would have major effects on the commercially zoned properties in White Pigeon and Mottville Township. Alternative alignments have been refined to minimize excessive disruption to sensitive land uses such as concentrations of residential properties, natural areas, or farm operations. Some localized areas of incompatibility are unavoidable. PA-5 and PA-5 MOD have the least disruption to adjoining land uses since they would maximize the usage of the existing roadway without expanding the facility. Alternatives using new alignments were developed to minimize impacts to higher concentrations of sensitive land uses like residential development and to avoid splits of farms to the extent feasible.

Impacts of a No-Build Alternative: With a No-Build Alternative, existing land use, as described in **Section 3.1, Land Use**, would likely remain consistent with existing conditions. Development can be expected to increase in proportion to the forecast growth in area populations. Commercial and light industrial uses along US-131 would likely remain from US-12 south to the I-80/90 Indiana Toll Road as businesses try to capitalize on the access provided by these three highways. The current mix of older housing and commercial uses in the Village of Constantine should remain, although traffic growth on US-131 would make the downtown less conducive for non-motorized uses. Current commercial land uses would likely remain along US-131 in the City of Three Rivers. New residential subdivisions to the west of US-131 in Three Rivers are also likely to be developed, as the City, Fabius Township, and Lockport Township grow. Current agricultural uses along US-131 should remain essentially unchanged with a No-Build Alternative.

Table 4.1 Existing Land Use Within Potential Right-Of-Way Required for Construction

Land Use - New Right-of-Way Required for Construction	Alternative No-Build		Alternative PA-1		Alternative PA-2		Alternative PA-3		Alternative PA-4		Alternative PA-5		Alternative PA-5 MOD	
	ac.	%	ac.	%	ac.	%	ac.	%	ac.	%	ac.	%	ac.	%
Agriculture*	0	0	492.0	58.0%	512.0	55.0%	571.0	65.0%	563.0	62.0%	109.0	81.3%	39.0	66.0%
Forest	0	0	46.0	5.0%	24.0	2.0%	49.0	6.0%	19.0	2.0%	11.9	8.9%	7.0	11.9%
Non-forest/ Undeveloped	0	0	74.5	9.0%	48.5	5.0%	75.0	9.0%	47.0	5.0%	6.0	4.5%	7.0	11.9%
Wetlands	0	0	16.3	<1%	22.4	3.0%	23.0	3.0%	57.9	6.0%	0.5	0.4%	0.5	1.0%
Residential	0	0	92.0	11.0%	104.0	11.0%	94.0	11.0%	135.0	15.0%	5.0	3.7%	4.0	7.0%
Commercial	0	0	63.5	8.0%	98.0	11.0%	31.0	3.0%	70.0	8.0%	1.5	1.1%	1.5	2.5%
Industrial	0	0	56.0	7.0%	114.0	12.0%	35.0	3.0%	22.0	2.0%	0.0	0.0%	0.0	0.0%
Institutional	0	0	5.0	<1%	1.0	<1%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
Recreational	0	0	0.0	0.0%	1.0	<1%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%
Total**	0	0%	845	100%	925	100%	878	100%	914	100%	134	100%	59	100%

ac.=acres (totals are rounded). %=Percentage of potential right-of-way for the alternative.

*Does not include indirect farmland impacts through the relocation of farm buildings, as discussed in **Section 4.2, Farmland Impacts**

**Totals may not add up precisely due to rounding

Source: Natural Resource Conservation Service (NRCS) GIS Data Base (2000).

Impacts of Build Alternatives: Each of the Build Alternatives would directly impact existing residential and agricultural land uses. **Table 4.1** shows the potential acreage of different categories of land use directly impacted by the ROW required for each alternative.

Off-alignment highway improvements would reduce the land available for other uses within the study area and would impact development patterns, especially where potential new interchanges and intersections are constructed. As **Table 4.1** illustrates, the Build Alternatives have the greatest land use impact on agricultural land. These impacts are discussed in detail in **Section 4.2, Farmland Impacts**. **Section 4.5, Relocation Impacts** looks at the required relocation of people and current land uses due to the ROW requirements of the Build Alternatives.

4.1.1 Compatibility with Zoning/Official Plans

This section presents an assessment of the Practical Alternatives with regard to compatibility with established zoning and land use plans for the affected communities. **Section 4.26, Indirect and Cumulative Impacts** builds on this analysis by assessing the potential for indirect development associated with each alternative. **Figure 4.1** presents a composite future land use map for the study area based on current land use plans for the affected communities. **Table 4.2** lists the community zoning ordinances and the primary zoning districts located within the US-131 Study Area. The zoning ordinances and land use plans for each community were consulted in preparing this analysis. MDOT would administer potential relocations in consultation with the local communities to ensure that zoning and setback requirements would be followed.

Placeholder for Figure 4.1 Composite Future Land Use Map

Table 4.2 Zoning Setbacks within the US-131 Study Area

Community	Date	Zone	Front (ft)	Side (ft)	Rear (ft)
York Township Indiana	None	Discussion with planning officials in Elkhart County, Indiana, indicates that York Township has no active zoning and has not produced a land use plan in more than thirty years.			
Mottville Township	1982	Setbacks for all buildings shall be 83' from the center of road for all State and US Highways.		10	10
White Pigeon Township	1997	AR: Agriculture/Residential C: Commercial I: Industrial	40 40 40	10 15 10	35 35 35
Village of White Pigeon	1993	R1: Rural Residential R2-3&LR: Medium/Low Density Residential B: Business AG: Agricultural	40 40 50 40	40 10 20 20	NA NA NA NA
Constantine Township	1994	R1: Single Family Residential AG1-2: Agriculture C1: Commercial/Industrial	25 25 50	12 15 20	10 15 20
Village of Constantine	2000	R1: Single Family Residential R2: One and Two Family Residential RM1: Multi-Family Residential CBD: Central Business District C1: General Commercial I1: Industrial	20 16 25 NA 30 50	12 12 20 NA 20 20	NA NA NA NA NA NA
Fabius Township	2000	R1: Rural Single Family Residential R2: Low Single Family Residential R3: One and Two Family Residential R4: Multi-Family Residential A1: Agricultural District	40 30 40 50 40	40 10 10 30 20	40 40 40 30 40
City of Three Rivers	1999	R1-2: Single Family Residential R3-4: One and Two Family Residential R5: High Density Residential B1-2: Neighborhood/General Business I1-2: Light/General Industry	30 25 35 30 30	10 10 20 10 10	NA* NA* NA* NA* NA
Lockport Township	1999	AP: Agriculture-Production SF: Single Family Residential MF: Multi-Family Residential RC: Retail-Commercial SC: Service-Commercial LI: Light Industrial M: Manufacturing	50 40 35 25 25 50 50	10 30/10 10/25 15/25 25 25 40	NA 25 25 10% of lot 25 50 50
Sources: Elkhart County, Mottville Township, White Pigeon Township, Constantine Township Zoning Ordinance, Village of Constantine, Fabius Township, City of Three Rivers, Lockport Township. * Unless contiguous to residential district, then rear yard is 20' minimum.					

Impacts of a No-Build Alternative: The No-Build Alternative would have no substantial effect on zoning and land use. According to the land use plans for the communities in the study area, residential growth is planned to move west of existing US-131, particularly along the St. Joseph River and on the west side of the City of Three Rivers.

Impacts of Build Alternatives: Each Build Alternative involves introducing highway impacts onto land currently zoned for agricultural, residential, commercial, and industrial uses to varying degrees. PA-1 through PA-4 would construct a new limited access freeway along varying amounts of existing and new alignment. PA-5 and PA-5 MOD would generally follow the existing corridor with the exception of a bypass of the Village of Constantine (see **Figure 2.3 (sheets 1 and 2)**). These two alternatives maintain much of the existing roadway cross-section and continue to provide at-grade road intersections. New highways are generally compatible with areas zoned for agricultural land uses, because land can be farmed right up to the highway ROW. However, each Build Alternative splits (passes through the central part of) from two to 18 farm parcels and severs the edges of several more. These splits and severances would present further challenges to large scale agricultural operations along the highway by requiring reconstruction of irrigation systems for smaller fields and requiring the movement of farm equipment between parcels located on either side of a new highway facility. For the Constantine bypass in PA-5 and PA-5 MOD, MDOT is proposing that farm access roads be built across the alternatives' 66 feet of ROW for access to split farming parcels. Farm access roads would generally be short, gated, at-grade, one-lane roads constructed perpendicular to the PA-5 or PA-5 MOD alignment. They would extend to the ROW line and would be about 66 feet in length, allowing farm equipment to directly access fields on the other side of the alternative's alignment. The access roads would allow these parcels to continue to be farmed, thus keeping acreage in production, while minimizing ROW takes and cost.

In locations where the Build Alternatives impact residential areas, they would be less compatible with existing zoning. In addition to direct impacts, some additional homes may require relocation due to zoning set-back requirements as discussed in **Section 4.5, Relocation Impacts**. Highway improvements would generally be compatible with areas zoned for commercial and industrial uses, as businesses typically prefer good highway accessibility for consumer access and to aid in the movement of goods. The Build Alternatives would improve access via reduced travel times for many existing businesses, but access limitations would constrain new development along the freeway or controlled-access roadway, and would thus be compatible with the agricultural zoning that exists on non-trunkline routes within most of the study area.

All Build Alternatives bypass the Village of Constantine to the west, except for a short portion of PA-5 MOD. The bypasses are not adjacent to the industrially zoned areas on the east side of Constantine or the business district in downtown Constantine. However, these areas would continue to have access via existing US-131. Because industrial land uses often seek locations near highways, there may be local pressure for rezoning near proposed interchange or intersection locations.

Mottville Township recognizes the likelihood of improvements to US-131 or relocation of US-131 in its official plan, while officials from other communities have been involved in discussion of US-131 improvements for years. Therefore, the Build Alternatives are generally compatible with the future land use plans of the local communities, although there may be specific areas of concern. The following discusses the specific zoning/land use issues associated with each of the Build Alternatives.

Impacts of PA-1: PA-1 would be compatible with existing zoning south of the St. Joseph River although it would impact some agricultural land, these impacts could include the conversion of farmland, potentially causing future indirect impacts. As traffic increases, there would be the potential for further commercial development around the US-131/US-12 intersection to partially serve through traffic. Currently there is land zoned for industrial use in this area, some of which is vacant and could be developed.

PA-1 directly impacts a residential area at Riverside Drive and a rural residential area at Miller's Mill Road. Households at these locations would require relocation. PA-1 also features a new freeway interchange at Quarterline Road in what is currently an agricultural area. The properties along Quarterline Road leading into Constantine are currently zoned as single-family residential up to the current intersection of Quarterline Road and US-131.

The proposed PA-1 interchange at M-60 would occupy land currently zoned for commercial or industrial properties. These land uses can be expected to continue with an interchange in this area. North of M-60, PA-1 passes through a large area of land currently zoned as low-density residential in Fabius Township that is not fully developed. This zoning is compatible with the freeway alternatives.

PA-1 would have an interchange west of existing US-131 near Cowling Road on what is now agricultural land. This interchange is in close proximity to the American Axle automotive supply plant and other industrial and commercial properties and is compatible with existing land uses, except for the agricultural impacts. The proximity of the interchange to other commercial/industrial development may result in some of the existing agricultural zoning and land use changing to commercial and/or industrial uses adjacent to the interchange. Overall, PA-1 would have only minor potential zoning and land use impacts.

Impacts of PA-2: PA-2 would require the relocation of the majority of the businesses on the east side of existing US-131 between Indian Prairie Road and Dickinson Road and most of the businesses near the US-131/US-12 intersection. PA-2 utilizes much of the zoned industrial and commercial land in Mottville Township and the Village of White Pigeon. PA-2 would have a substantial impact on existing zoning in these areas as new industrial and commercial land would be needed in the southern part of the study area to accommodate the relocated properties.

Between Dickinson Road and Garber Road, PA-2 would have similar land use impacts to those of PA-1, including the impacts of an interchange at Quarterline Road.

The PA-2 interchange at M-60 would be located at the existing US-131/M-60 intersection and would affect the Three Rivers Industrial Park located southeast of the existing intersection. As the land around the proposed interchange is primarily zoned commercial and light industrial, this does not represent a major land use change, and therefore would not represent a zoning compatibility issue. A few of the businesses would require relocation.

Although PA-2 would be an on-alignment freeway through the City of Three Rivers, service drive access would be provided to existing properties and many of the existing commercial, industrial, and scattered residential land uses would remain. Sixteen businesses in this area would potentially require relocation due to setback requirements; this could require changes in zoning to accommodate business relocations in close proximity to their existing locations. Overall, PA-2 has the most potential land use and zoning impacts of all of the Practical Build Alternatives.

Impacts of PA-3: PA-3 would impact a series of rural residences and agricultural land uses to the west of existing US-131 between Anderson Road and Dickinson Road. All of this land, with the exception of the properties fronting on US-12, is in an Agriculture and Rural District as defined by the Mottville Township Zoning Ordinance. PA-3 should not alter the land uses along existing US-131 in this area. The PA-3 interchange at US-12 would impact an area zoned as single family residential, as well as agricultural properties.

North of Dickinson Road, the PA-1 and PA-3 alignments are identical and the land use and zoning impacts should be the same through to the northern limit of the study area. Like PA-1, PA-3 is generally compatible with existing zoning and only minor changes in zoning should be expected.

Impacts of PA-4: PA-4 follows the same alignment and has the same impacts as PA-3 between the southern study area limits and Dickinson Road. Between Dickinson Road and the south side of the St. Joseph River, PA-4 passes through less developed rural residential areas than do PA-1, PA-2, and PA-3. New highways are generally compatible with areas zoned for agricultural uses because land can be farmed up to the ROW line. The PA-4 interchange at Youngs Prairie Road impacts agricultural and residential land. The single family homes fronting on Youngs Prairie Road in this area could potentially be converted to home office/business uses because businesses may be attracted to the access and visibility provided by the interchange, and existing residents may choose to seek locations off of this proposed through connection to downtown Constantine.

Between Indian Prairie Road and M-60, PA-4 impacts agricultural land and scattered low-density residential areas. These land uses should continue to exist along this stretch of PA-4. The PA-4 interchange at M-60 would occupy land currently zoned for commercial or industrial development. As with PA-1 and PA-3, similar land uses can be expected to continue with an interchange in this area. North of M-60, the land use impacts of PA-4 would be similar to those for PA-1 and PA-3. Like PA-1 and PA-3, PA-4 has minor overall zoning impacts.

Impacts of PA-5: PA-5 would have substantially less impact on adjacent properties than PA-1 through PA-4. Much of this alternative would retain a two-lane facility on existing US-131 alignment with some localized access consolidations and minor intersection and shoulder improvements as warranted. As a result, PA-5 would be consistent with most zoning and land use planning that has taken place in the past. South of Dickinson Road, improvements to the corridor would be minimal (similar to the No-Build Alternative), with only geometric improvements at Anderson and Eagley Roads. The remaining existing geometrics would be maintained.

Between Dickinson Road and Garber Road, PA-5 follows a westerly bypass of the Village of Constantine, impacting many of the same properties as listed above in the descriptions for PA-1, PA-2 and PA-3. However, the overall impact of land use changes in this bypass would be substantially lower for several reasons. First, a narrower ROW associated with a two-lane undivided roadway would directly impact fewer properties than the four-lane divided freeway would under PA-1 through PA-3. Second, no service drives would be needed to maintain local access. Finally, PA-5 would provide an at-grade crossing of Quarterline Road, and therefore, the ROW taken up by freeway ramps and fill slopes for the interchange required for PA-1 through PA-3 would not be needed. As in PA-1 through PA-3, PA-5 directly impacts a residential area at Riverside Drive and a rural residential area at Miller's Mill Road. Households at these locations would require relocation.

North of the Constantine bypass, PA-5 would have minimal direct impacts on adjoining land uses, because it would continue to maintain the existing US-131 alignment. There would be localized widening for truck climbing lanes between Garber and Gleason Roads, however, little or no new ROW would likely be needed. Intersection improvements at M-60 and minor roadway and access management improvements to the north would not affect land use.

Impacts of PA-5 MOD: PA-5 MOD would generally have similar land use impacts to those of PA-5. The primary difference is that the bypass of Constantine under PA-5 MOD would follow the same alignment as PA-5 until the vicinity of North River Road where PA-5 MOD would turn northeast and connect into the existing right-angle turn on US-131 forming a four-legged intersection (see **Section 2.4.6, Practical Alternative 5 Modified**). At this point, the alignment would connect with existing US-131 and continue northward on the existing alignment. The resulting bypass would be shorter than in PA-5 and the other Build Alternatives, and would substantially reduce the mostly agricultural impacts associated with the northern half of the Constantine bypass. It would also eliminate residential impacts in the vicinity of Youngs Prairie Road and Millers Mill Road. The only indirect effect of PA-5 MOD is that residential and commercial properties in Constantine along US-131 north of the St. Joseph River would be exposed to more traffic, whereas this area would be bypassed by through traffic under all of the other alternatives. PA-5 MOD improvements and impacts north of Garber Road would be the same as with PA-5.

4.2 Farmland Impacts

All Practical Alternatives would directly impact less than 0.25 percent of the total farmland in the County. For this reason, none of the Practical Alternatives would have a substantial regional impact on farmland, farm employment, or farm production. None of the Practical Alternatives would have a substantial indirect impact on farm operations as the number of parcel splits is low, and compensatory mitigation would be provided to farmers impacted in this fashion. Because all Practical Alternatives would affect a low percentage of prime farmland and no unique farmland would be affected, none of the Practical Alternatives would have a major impact on these specially-designated farmland types.

4.2.1 Prime and Unique Farmland

Any federal action that would result in conversion of farmland to a non-agricultural use requires coordination with the Natural Resources and Conservation Service (NRCS). Coordination is accomplished through a Land Evaluation Site Assessment (LESA), which measures the relative value of farmland affected, and assigns a score according to set criteria. The evaluation includes direct and indirect conversion. The Form AD 1006, which evaluates the impacts of farmland conversion, is provided in **Appendix B**. The LESA provides a numerical score for assessing farmland conversion impacts, ranging from 100 to 260.

Table 4.3 provides a comparison of the acreage of direct impact, and LESA scores for all of the Practical Alternatives. Direct impacts refer to farmland that would potentially be acquired as ROW for construction of road and drainage improvements. Indirect farmland impacts include properties that are uneconomic remainders as a result of a direct impact to the farming operation. As defined by the FHWA Real Estate Appraisal Guide, an uneconomic remainder is a parcel of real property in which the owner is left with an interest after the partial acquisition of the owner's property, and which the acquiring agency has determined has little or no value or

utility to the owner. These parcels are sometimes sold or leased to adjoining property owners for continued agricultural production.

Table 4.3 Acreages of Farmland Impacted and LESA Scores

Practical Alternative	Number of Actively Farmed Parcels	Number of Parcel Splits	Total Acres of Active Farmland Impacted	Total Acres of Indirect Farmland Impacts *	Total Acres of all Land Uses Impacted	Percentage Farmland of all Impacted Land	LESA Score (Scale from 100 to 260)
No-Build	0	0	0	0	0	N/A	N/A
PA-1	48	18	492	47	845	58%	146
PA-2	50	10	512	27	925	55%	169
PA-3	56	17	571	34	878	65%	173
PA-4	50	13	563	41	914	62%	176
PA-5	21	5	109	62	134	81%	164
PA-5 MOD	12	2	39	25	59	66%	127

* Indirectly impacted farmland is land that is not required for construction and could remain in agricultural use.

No-Build Alternative: The No-Build Alternative would not directly or indirectly impact any farmland.

Impacts of Build Alternatives: As the LESA scores indicate, PA-5 MOD would have a lower impact than all other Build Alternatives. Among the Build Alternatives, PA-1 shows a lower impact than PA-2, PA-3, PA-4 and PA-5, which are comparatively similar in their level of impact by LESA scoring procedures.

The acreage of active farmland potentially impacted by the project would vary from 39 acres under PA-5 MOD to 571 acres under PA-3. Less than one acre of land is impacted in Elkhart County, Indiana under all Practical Alternatives, so virtually all of this land is in St. Joseph County. According to the 1997 St. Joseph County Master Plan, in 1992 the total number of acres of farmland in St. Joseph County was 234,823 acres. Therefore, all Practical Alternatives would directly impact less than 0.25 percent of the total farmland in the county.

Indirect Impacts of Build Alternatives: Each Build Alternative would require additional land acquisition outside of the required right-of-way as a result of various parcels becoming unusable or landlocked. A parcel is considered landlocked and/or unusable if the proposed highway construction splits it in such a way that the only remaining access to the property would be across another landowner's property. As **Table 4.3** indicates, Practical Alternatives PA-5 and PA-5 MOD would require fewer parcel splits than the other Practical Alternatives. These impacts may be reduced through land sales, exchanges, or access agreements between property owners.

The direct and indirect farmland impacted by the Build Alternatives is mainly used for the production of seed corn, corn, and soybeans. One sod farm is also directly impacted by the freeway Build Alternatives, PA-1 through PA-4. There is no evidence of feedlot or pastureland affected by any of the Build Alternatives. At this stage, stakeholders, farmers, or the public have not identified any other indirect farming impacts or special concerns related to the Build Alternatives. The public will be given additional opportunity through the public hearing process to provide further comments and concerns. Any new comments or concerns will be addressed in the Final Environmental Impact Statement (FEIS).

4.2.2 Farmland and Open Space Preservation Program

Farmland can be classified as “prime farmland,” “unique farmland,” or “farmland that is of statewide or local importance,” pursuant to the Farmland Protection Policy Act (PL 97-98) of 1981. Unique farmland is defined as land other than prime farmland that is used for the production of specific high-value food and fiber crops such as citrus, tree nuts, olives, cranberries, fruits, and vegetables. Prime farmland has the best combination of physical and chemical characteristics for producing food, forage, fiber, and oilseed crops. Both unique and prime farmland cannot include urban built-up land or water bodies since these two are considered irreversible uses.

The numbers of farms throughout Michigan are in decline, although the average farm size has increased. **Table 4.4** describes the agricultural impacts of each Practical Alternative on farmland with special designations, specifically for land regulated under the Farmland and Open Space Preservation Program (Public Act 233, formerly referred to as P.A. 116), designated “Prime Farmland”, and designated “Unique Farmland” as defined in **Section 3.2, Farmland**.

Part 361 of the Natural Resources and Environmental Act, as amended, is intended to support the preservation of farmland and open spaces through restrictive covenants. Part 361 provides tax incentives for participation in the program. The Act also allows for lands acquired for highway improvements in the public interest to be released from this preservation program. MDOT would coordinate with the Michigan Department of Agriculture and impacted property owners to identify affected properties or portions of properties, which would require a public interest release.

Table 4.4 Impacts on Farmland with Special Designations

Practical Alternative	Number of P.A. 233 (P.A.116) Parcels (Acres)		Impacted Unique Farmland (acres)	Impacted Prime Farmland (acres)
No-Build	0	(0)	0	0
PA-1	11	(195)	0	551
PA-2	8	(144)	0	481
PA-3	7	(242)	0	514
PA-4	8	(256)	0	491
PA-5	5	(48)	0	109
PA-5 MOD	2	(15)	0	24

Impacts of a No-Build Alternative: The No-Build Alternative would not impact any farmland.

Impacts of Build Alternatives: As **Table 4.4** shows, there is little variation in the acreage of prime farmland impacted by the freeway Build Alternatives. PA-5 MOD shows the least impacted prime farmland followed by PA-5. No unique farmland is impacted by any Practical Alternative.

As stated in **Section 3.2, Farmland**, St. Joseph County, Michigan contains approximately 164,000 acres of prime farmland. The largest potential impact upon prime farmland is 551 acres associated with PA-1. This represents 0.34% of the total prime farmland in St. Joseph County. No other alternatives other than those already discussed in this document would be considered without a re-evaluation of the project’s potential impacts upon farmland.

4.2.3 Farmland Operations Impacts and Displacements

Minimizing farmland operational impacts and displacements was a goal during the development of all Practical Alternatives. Wherever possible, the Practical Alternatives follow existing property lines and minimize dividing or splitting large tracts of farmland. They cross fields at perpendicular angles to reduce the creation of uneconomic remainders where possible. However, some farming operations would be disrupted by all Build Alternatives. Potential impacts to farming operations are described below. Some secondary development may occur on existing farmland adjacent to proposed interchanges or intersections. These impacts are discussed more thoroughly in **Section 4.26, Indirect and Cumulative Impacts**.

Impacts of a No-Build Alternative: There are no farm displacements or impacts to farmland operations associated with the No-Build Alternative.

Impacts of Build Alternatives: **Table 4.5 in Section 4.5, Relocation Impacts**, lists potential displacements of farmland operations for each Practical Alternative. The non-freeway Build Alternatives (PA-5 and PA-5 Modified) would not require the displacement of any farmland operation. The potential impacts on farm operations by these two alternatives relate to the split of some farm parcels. All of the freeway Build Alternatives require the displacement of farmland operations including associated on-farm investments such as central pivot irrigation systems. PA-4 displaces eight farmland operations followed by PA-3 (seven), PA-1 (five), and PA-2 (two). Each of these freeway Build Alternatives splits several active farmland parcels as listed in **Table 4.3**.

4.3 Social Impacts

This section assesses the potential impacts to community facilities, travel patterns, and school bus routes. There are minimal community impacts associated with the Build Alternatives with the exception of potential direct and indirect impacts to several churches and some adjustments in travel patterns. These impacts will be mitigated and there are no major community resources that will be directly affected. Therefore, there will be no substantial impacts on any community resources associated with any of the Practical Alternatives.

4.3.1 Community Impact

The Build Alternatives impact churches more than any other community resource. As was shown in **Figure 3.3, Community Facilities**, other community resources are located within the study area, such as the Michigan State Police Post, police and fire services in Constantine, Three Rivers Hospital, and the Lockport/Fabius/Park Township fire station. The only one of these properties that would be impacted directly by this project is the Michigan State Police Post, discussed in greater detail in **Section 5.4.1, Site A - Michigan State Police Post, White Pigeon**. Therefore, the discussion that follows focuses primarily on the churches that are affected by the project.

Impacts include total relocation, partial acquisition of property, or indirect impacts like increased traffic noise as discussed in **Section 4.10, Noise Impacts**. Some alternatives also pass through neighborhoods within the study area. The freeway Build Alternatives north of M-60 are expected to have positive community impacts through improved operations and decreased congestion. There are no impacts to any school structures with any of the freeway Build Alternatives. School travel pattern are minimally impacted by any of the alternatives.

Impacts of a No-Build Alternative: There would be no direct impacts to community facilities, schools, or neighborhoods with the No-Build Alternative. As discussed in **Section 1.0, Purpose of and Need for a Proposed Action**, the crash history north of M-60 indicates that crashes should continue to occur at rates higher than state and regional averages with a No-Build Alternative. Projected increases in traffic along US-131 would likely increase traffic inefficiencies and potential crashes, resulting in some potential change in local traffic patterns, including school traffic, to avoid US-131.

Impacts of Build Alternatives: PA-1 through PA-4 would include a limited access freeway north of Dickinson Road that would have only a minor impact to the basic travel patterns throughout the corridor. Under PA-5 and PA-5 MOD, at-grade crossings would be provided, and therefore changes to travel patterns (other than a bypass of the Village of Constantine) would be minimal (see **Figure 2.3 (sheets 1 and 2)**). School bus routes and emergency service access to the community would not be at risk with any Build Alternative. Local roads would either access US-131, cross US-131, or remain accessible by other roads or service drives. Under PA-1 through PA-4, the majority of US-131 crossings would be grade separated, which would improve travel time and accessibility on the local road system. Access would be maintained to existing and proposed US-131 for all Build Alternatives, and construction should not impact the Three Rivers Hospital, located one block east of US-131 on Broadway Road. There would be no impacts to area school facilities with any Build Alternative.

Impacts of PA-1: PA-1 has minor impacts on community facilities. In White Pigeon, PA-1 would require minor property acquisitions from the Riverview Mennonite Church on existing US-131 just north of the White Pigeon River, and the Michigan State Police Post at the US-131/US-12 intersection. The structures and parking for these two facilities would not be affected. The Riverview Mennonite Church would experience noise levels exceeding the noise abatement criteria (NAC) thresholds, while the State Police Post would not.

PA-1 would have minimal impacts on school traffic patterns. Nearly all of the roads that are used as school bus routes are grade separated to maintain east-west access. Those that are closed such as North River Drive, Millers Mill Road, Garber Road, and Coon Hollow Road, are close to service drives or other grade separated roads that could easily be used. West of Constantine, PA-1 would pass between the Riverside Apartments and neighboring houses on Riverside Drive. The Riverside Apartments would experience noise levels exceeding the NAC. Access would be maintained within this residential area as Riverside Drive would be grade separated. North of Constantine, residential relocations would be required in the neighborhood adjoining Youngs Prairie and Millers Mill Roads. There would also be receptors experiencing noise levels exceeding the NAC in this neighborhood.

North of M-60 approximately 11 parking spaces out of 22 by the Christian Reformed Church would be taken by PA-1. There is enough available space north of the Church that could be used to replace lost parking spaces. The church itself would not require relocation but would experience noise levels exceeding the NAC. PA-1 would also require small amounts of property from the Seventh Day Adventist Church, St. Peter's Evangelical Lutheran Church, and the Church of the Nazarene, all located north of M-60. The parking and buildings for these churches should not be impacted but all churches except St. Peter's Evangelical Lutheran Church would experience noise levels exceeding the NAC during the operation of the freeway. PA-1 would require some acquisition of property from the Agape Family Church, at the north-end of the study area, and affect no less than ten parking spaces. The church has adequate undeveloped land on their lot to replace these lost spaces if desired. The church would not experience noise levels exceeding the NAC.

Impacts of PA-2: PA-2 would require the relocation of the Riverview Mennonite Church on US-131, north of the White Pigeon River. PA-2 would also require the relocation of the Michigan State Police post due to the proposed US-131/US-12 interchange. North of the US-131/US-12 interchange, PA-2 requires the potential relocation of more than 50% of the existing units in the Colonial Estates mobile home park. Some units remaining in the park would experience noise levels exceeding the NAC. As with PA-1, PA-2 would separate the residences along Riverside Drive from the Riverside Apartments on the east side of the proposed alignment, and there would also be relocations in the neighborhood near the intersection of Youngs Prairie and Millers Mill Roads. PA-2 would have the same noise impacts as PA-1 at these locations. The Charity Baptist Church, approximately 1.25 miles south of M-60, would require relocation. North of M-60, PA-2 would require small acquisitions of property from the Christian Reform Church, Seventh Day Adventist Church, St. Peter's Evangelical Lutheran Church, and the Church of the Nazarene. The parking and buildings of these churches would not be affected. All of these churches except St. Peter's Lutheran Evangelical Church, would experience noise levels exceeding the NAC.

PA-2 would have similar impacts on school traffic patterns as those of PA-1. However, the general traffic patterns in the vicinity of the US-131 interchanges with US-12, M-60, and Cowling Road would be altered, due to relocations of local roads with this alternative. Access to all community facilities would be maintained.

Impacts of PA-3: There are no community impacts associated with PA-3 from the south study area limits to the Village of Constantine, other than minor school traffic impacts similar to those of PA-1. From Riverside Drive north, the community impacts of PA-3 are the same as those of PA-1.

Impacts of PA-4: As with PA-2, PA-4 would also require the relocation of the Charity Baptist Church. PA-4 would terminate Quarterline Road on the east and connect it with a service drive on the west, which connects to the Youngs Prairie interchange, providing continuous east-west access for school and local traffic. Other community impacts including school traffic patterns would be similar to those of PA-1.

Impacts of PA-5: PA-5 from just south of M-60 would remain a mostly two-lane facility either on the existing US-131 alignment or as a bypass of the Village of Constantine. New or existing at-grade intersections would continue to serve local traffic patterns. No churches are expected to experience any direct impacts from ROW takings, although there may be noise impacts associated with PA-5.

The Riverview Mennonite Church on existing US-131 north of the White Pigeon River: would experience noise levels exceeding the NAC and the Michigan State Police Post would not experience noise levels exceeding the NAC. There would be no direct impacts on either the church or the police post. PA-5 would be in close proximity to the Colonial Estates mobile home park; but no acquisitions of homes are anticipated. The residences closest to US-131 would not experience noise levels exceeding the NAC. As with PA-1, PA-2, and PA-3, the corridor would pass between the Riverside Apartments and neighboring houses on Riverside Drive, although the corridor would be narrower than with the other alternatives. The Riverside Apartments would not experience noise levels exceeding the NAC. North of Constantine, residential relocations would be required in the neighborhood adjoining Youngs Prairie and Miller Mill Roads. However, these relocations would be fewer in number than under PA-1, PA-2, PA-3, and PA-4 as a result of the narrower roadway cross-section.

North of M-60, as in PA-1 through PA-4, the Christian Reformed Church would experience noise levels exceeding the NAC, but St. Peter's Evangelical Lutheran Church would not experience noise levels exceeding the NAC.

Impacts of PA-5 MOD: PA-5 MOD is the same as PA-5 from the Indiana Toll Road to North River Road. The primary difference is that in the vicinity of Quarterline Road, PA-5 MOD would reconnect with US-131 at the US-131/Youngs Prairie Road intersection. This is the location of the existing US-131 right-angle turn in the Village of Constantine. There would be potential impacts to the residential neighborhood southwest of the US-131/Youngs Prairie Road intersection as the new road would cut through the subdivision to connect to existing US-131.

From this point northward, PA-5 MOD would follow existing US-131, with only the addition of truck climbing lanes between Garber and Gleason Roads and minor roadway and intersection improvements within the existing right-of-way.

4.4 Environmental Justice

Executive Order 12898, issued in 1994, requires every agency undertaking a transportation project that is fully or partially funded by the federal government to consider the impact of such a project on minority populations and/or low-income groups. At the core of environmental justice are the following three fundamental principles.

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority and low-income populations.
- Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

No potential disproportionately high and adverse impacts to minority or low-income populations were identified for any of the Practical Alternatives and there will not be substantial impacts on Environmental Justice communities associated with the proposed project. This section discusses the analysis and coordination performed as a part of the Environmental Justice evaluation.

4.4.1 Population and Income Composition

Identifying the size and geographic location of minority and/or low-income populations within the study area was the first milestone in completing the Environmental Justice analysis for the US-131 improvement study. Census data sets were chosen as a primary data source for the Environmental Justice analysis due to their accessibility, update cycle, format, and comprehensiveness.

As a supplement to census data, all residential addresses within the study area were provided to the State of Michigan Family Independence Agency (FIA) to determine the number of residences within the study area receiving public assistance. Information provided by the FIA is valuable for rural areas where the percent poverty rate within census tracts and block group units can be misleading due to the low population. The FIA does not, however, provide the addresses of households receiving public assistance. The FIA determined that 62 residential

addresses out of approximately 5,979 households within the communities of the study area were dependent on various state and federal assistance programs. Eligibility for state and federal assistance programs requires individuals to fall below designated poverty levels. **Appendix D.1** provides the information obtained from the FIA.

Local churches were also contacted because of their particular insight into the local community structure. The churches provided general information regarding their congregation composition in terms of minority and low-income members. Minority or low-income members comprised no more than 10% of any congregation, with the majority of congregations containing only a few families. Local pastors indicated that the higher concentrations of minority and low-income populations in the area were outside and generally east of the US-131 study area, and that disproportionate impacts on low income or minority populations should not be expected with any of the alternatives under study. **Appendix D.6** provides a listing of churches contacted including church name and address.

The Colonial Estates mobile home park and the Riverside Apartments were the only potentially affected clusters of denser residential development within the US-131 study area. Residential relocations are required in the Colonial Estates mobile home park with PA-2, while PA-1, PA-2, PA-3, PA-5, and PA-5 MOD would pass near the Riverside Apartments. The management of these entities were also contacted to determine the potential for disproportionate impacts on low-income residents. Discussions with park and apartment managers indicated that no government subsidized housing/rental units were present and that average income levels were well above the poverty threshold as defined by the 2000 U.S. Census data.

Analysis of census data revealed that the US-131 study area can be characterized as having an evenly distributed population of low-income residents with an average poverty rate (8.2%) comparable to the averages of St. Joseph County (11.3%), Elkhart County (7.8%), the State of Michigan (10.5%), and the State of Indiana (9.5%). **Table 3.3 in Section 3.4, Selected Population Characteristics** compares the population composition of the communities within the study area with those of St. Joseph and Elkhart County, and the states of Michigan and Indiana. These comparisons help put into context the size of the minority population within the study area. The percentage of minorities estimated to be living within the study area (7.2%) is lower than the Elkhart County, Indiana (22.5%), St. Joseph County, Michigan (8.7%), State of Indiana (16.0%), and State of Michigan (21.4%) averages. Approximately 93% of the populations within the study area are part of the ethnic group of white/Caucasian. The small percentage of minorities in the study area is dispersed, and no concentration of minority groups would be disproportionately impacted by any of the Practical Alternatives.

Although there are no disproportionate impacts to minority or low income groups within the study area, these groups are impacted by the Practical Alternatives as part of the overall population. Environmental impacts posed by each Practical Alternative on the study area population are discussed in the respective sub-sections of **Section 4.0, Environmental Consequences**. There are varying degrees of both favorable and unfavorable impacts posed by each Practical Alternative. These impacts are associated with several elements including land-use, relocation, economics, air quality, noise, community facilities, natural environment, and construction. While some adverse impacts are unavoidable, the Michigan Department of Transportation (MDOT) would take all the necessary measures, to the greatest extent possible, to mitigate impacts while improving transportation. Proposed mitigation measures for adverse impacts are discussed in **Section 4.30, Mitigation Summary**.

4.4.2 Public Involvement Efforts

To ensure full and fair participation by all potentially affected communities, including minority and low-income groups, a series of three public meetings were held. Prior to each public meeting, announcements were printed in local newspapers. All residents within the study area were invited to participate in the decision making process. **Section 6.0, Public and Agency Coordination** provides the dates, locations, and summaries of US-131 public information meetings. In addition to public meetings, the communities of White Pigeon, Constantine, Three Rivers, and local township officials were contacted to discuss planning and socio-economic issues. Project maps and contact information were sent to local churches to be presented to the congregation to increase local awareness and public involvement. Other public involvement efforts have included an internet web page, a toll free number for contacting MDOT study team members, project newsletters, and public meeting brochures. A Public Hearing will take place following publication of this Draft Environmental Impact Statement.

Although there are no disproportionate impacts on minority and low-income populations, a continuing effort will be made to identify disproportionately high and adverse impacts to minority and low-income populations during subsequent phases of this project. If such impacts are identified, every effort will be made to involve impacted groups in the project development process and to avoid or mitigate these impacts.

4.5 Relocation Impacts

This section describes the residential, business, farm, and community facility impacts associated with each Practical Alternative. Potential relocation impacts are identified for each Practical Alternative in **Table 4.5**. These impacts are shown by segment to allow for comparison of the impacts on different areas within the study corridor.

All relocation assistance would be provided in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Resources would be made available without discrimination to all residential and business owners who are relocated. Under the requirements of this Act, no relocations can occur until it is shown that comparable housing is available in the area for relocation purposes. Replacement housing must be similar both in type and price range.

Substantial relocation impacts would include displacement of more than 100 residences, a large number for a predominantly rural area, and the displacement of the majority of businesses along US-131 in a particular community. PA-2 would have substantial impacts on residential areas and businesses in the study area as it would require the displacement of 110 residences and 64 businesses, including the majority of businesses along US-131 in the Village of White Pigeon. PA-4 would have a substantial impact on residents, impacting 113 residences. All of the other alternatives would have lower levels of impact. The relocations for PA-5 and PA-5 MOD are substantially lower than for the freeway Build Alternatives.

The zoning setback requirements for the local communities, as presented in **Section 4.1.1, Compatibility with Zoning/Official Plans**, were utilized in identifying the potential relocations for each Build Alternative. While zoning variances are sometimes an option to minimize relocations, none were assumed in estimating the relocations required for the Build Alternatives. Farm operations relocations represent instances where the right-of-way (ROW) for the Build Alternatives requires the relocation of the major farm buildings and/or more than 50% of the

land within the farm. The ROW for the Build Alternatives impacts several additional agricultural parcels but does not impact more than 50% of the land or the major farm buildings. The overall impacts on farmland are discussed in **Section 4.2, Farmland Impacts**.

Impacts of a No-Build Alternatives: The No-Build Alternative would not require any relocations.

Impacts of Build Alternatives: Relocation estimates for all properties are based upon a worse case scenario of acquiring all structures that would not comply with zoning setbacks due to ROW acquisition. Estimates also assume acquiring the full property if the principal residence or business requires relocation. The residential relocations for all of the Build Alternatives consist of single family homes and farmsteads, and are representative of the overall housing stock within the study area. The freeway Build Alternatives (PA-1 to PA-4) require substantially more relocations than the non-freeway Build Alternatives (PA-5 and PA-5 MOD). Most of the residences potentially relocated appear to be owner-occupied. No multi-unit rental property relocations are required; a few of the relocations may be single family home rentals, although none have been identified. Analysis of census data and community information indicates that the residential displacements would include a very small percentage of minority and low-income households. No disproportionate impacts were identified as a part of the Environmental Justice review discussed in **Section 4.4, Environmental Justice**.

The business and farm relocations for each of the Build Alternatives would require the relocation of a number of jobs. An estimate of the jobs connected with the business and farm relocations for each of the Build Alternatives is presented in **Table 4.6**. The relocations for the Build Alternatives would also have an impact on the tax bases of the local communities as further described in **Section 4.6, Economic Impacts**.

There is one potential relocation in the Indiana portion of the study area. This is a potential business relocation due to the proximity of a service station canopy to the five-lane ROW proposed for PA-1, PA-2, PA-3, and PA-4 at that location.

Table 4.5 Relocation Impacts by Alternative and Segment

Alternatives/ Segments		Residential			Business					Farm		Community Facilities		
		Single-Family Residences	Mobile Homes	Residential Total	Light Industrial	Service	Retail	Vacant Sites for Sale/Rent	Business Total	Farm Operations	Barns	Churches	State Police Post	Community Facilities Total
No-Build	Segment A	No Relocations			No Relocations					No Relocations		No Relocations		
	Segment B													
	Segment C													
	Segment D													
	No-Build Total	0			0					0		0		
PA-1	Segment A	5	-	5	-	-	2	-	2	-	-	-	-	-
	Segment B	27	-	27	-	-	-	-	-	1	3	-	-	-
	Segment C	21	-	21	2	3	2	-	7	1	2	-	-	-
	Segment D	6	-	6	-	-	3	-	3	3	3	-	-	-
	PA-1 Total	59	-	59	2	3	7	-	12	5	8	-	-	-
PA-2	Segment A	19	57	76	12	8	19	-	39	-	2	1	1	2
	Segment B	29	-	29	-	-	-	-	-	2	3	-	-	-
	Segment C	3	-	3	6	3	14	-	23	-	-	1	-	1
	Segment D	2	-	2	-	-	2	-	2	-	-	-	-	-
	PA-2 Total	53	57	110	18	11	35	-	64	2	5	2	1	3
PA-3	Segment A	27	-	27	-	-	1	-	1	1	3	-	-	-
	Segment B	30	-	30	-	-	-	-	-	2	3	-	-	-
	Segment C	21	-	21	2	3	2	-	7	1	2	-	-	-
	Segment D	6	-	6	-	-	3	-	3	3	3	-	-	-
	PA-3 Total	84	-	84	2	3	6	-	11	7	11	-	-	-
PA-4	Segment A	27	-	27	-	-	1	-	1	1	3	-	-	-
	Segment B	46	-	46	-	-	-	-	-	3	3	-	-	-
	Segment C	34	-	34	2	5	2	-	9	1	1	1	-	1
	Segment D	6	-	6	-	-	3	-	3	3	3	-	-	-
	PA-4 Total	113	-	113	2	5	6	-	13	8	10	1	-	1
PA-5	Segment A	-	-	-	-	-	-	-	-	-	-	-	-	-
	Segment B	8	-	8	-	-	-	-	-	-	-	-	-	-
	Segment C	-	-	-	-	-	-	-	-	-	-	-	-	-
	Segment D	-	-	-	-	-	1	-	1	-	-	-	-	-
	PA-5 Total	8	-	8	-	-	1	-	1	-	-	-	-	-
PA-5 MOD	Segment A	-	-	-	-	-	-	-	-	-	-	-	-	-
	Segment B	7	-	7	-	-	-	-	-	-	-	-	-	-
	Segment C	-	-	-	-	-	-	-	-	-	-	-	-	-
	Segment D	-	-	-	-	-	1	-	1	-	-	-	-	-
	PA-5 MOD Total	7	-	7	-	-	1	-	1	-	-	-	-	-
Segment locations are depicted on the fold out map in Appendix E . Segment A - White Pigeon Area: From southern project terminus to Dickinson Road Segment B - Constantine Bypass: From Dickinson Road to Gleason Road Segment C - Three Rivers South: From Gleason Road to Hoffman Road Segment D - Three Rivers North: From Hoffman Road to one-mile north of Cowling Road														

Table 4.6 Estimated Job Relocations

Alternative	Estimated Commercial/Industrial Jobs Relocated*	Estimated Agriculture Jobs Relocated*	Estimated Total Jobs Relocated
No-Build	0	0	0
PA-1	52	5	57
PA-2	680	5	685
PA-3	52	5	57
PA-4	82	5	87
PA-5	6	1	7
PA-5 MOD	6	1	7

*Business job relocations were obtained by contacting affected businesses and requesting their total employment. Estimates were made for the businesses for which data could not be obtained by using employment for similar businesses within the study area. Agriculture job relocations were estimated based on the average number of active farmland acres per employee (including farm proprietors), 115.9 acres, for St. Joseph County as obtained from the 1997 National Agriculture Statistics Service Census Data.

The following discusses the key details of the relocations connected with each Build Alternative.

Impacts of PA-1: PA-1 has the fewest total relocations of the freeway alternatives (PA-1 to PA-4). Only the non-freeway and No-Build alternatives have fewer total relocations. The businesses relocated by PA-1 are small to medium size establishments (25 or fewer employees), most with less than five employees. Based on conversations with business operators, the light industrial businesses relocated do not depend on their current location for viability and could be relocated elsewhere within the study area. The retail/service businesses are typical of those in most communities the size of those in the study area and these businesses should be able to find comparable new locations relatively easily. Few long term job losses are expected with PA-1, as it has only moderate potential employment relocations and relocates businesses that are not highly dependent on their current locations. Almost all of the businesses relocated by PA-1 own their premises.

Impacts of PA-2: PA-2 would have the second largest number of residential relocation impacts of all of the Practical Alternatives, including the potential relocation of an estimated 57 mobile/manufactured homes in the Colonial Estates mobile home community.

PA-2 would relocate the majority of the existing businesses around the US-131/US-12 intersection in the Village of White Pigeon, all of the current occupants of the Three Rivers Enterprise Park, and several businesses along US-131 in the City of Three Rivers. PA-2 would potentially relocate two light industrial facilities with more than 100 employees and several additional light industrial/commercial facilities with at least 20 employees. Enough vacant sites exist within the study area to accommodate these businesses, but given the number requiring relocation, there is the potential that some would choose not to remain within the study area communities. The potential for long-term job losses due to business relocations is greater with PA-2 than with the other alternatives. Most of the smaller retail/service businesses that PA-2 would relocate are typical of those found in communities the size of those within the study area. However, a few may depend on their location (e.g., US-131 and US-12) as a key element for their business, and may have some difficulty finding a comparable site. An estimated 55% of businesses potentially relocated by PA-2 own their premises while 45% rent. With few exceptions, the larger businesses tend to own their premises, while the smaller retail establishments are more likely to rent. As a result, more rental replacement locations would be

required for PA-2 than for the other Build Alternatives. Although there are a substantial number of commercial or light industrial locations available within the study area, finding adequate replacements for all of the businesses relocated by PA-2 would be more difficult than for the other alternatives.

The Michigan State Police post, the Riverview Mennonite Church, and the Charity Baptist Church are all community facilities that would require relocation by PA-2, as discussed in **Section 4.3.1, Community Impact**.

Impacts of PA-3: There is one potential relocation in the Indiana portion of the study area due to the proximity of a service station canopy to the five-lane ROW proposed for PA-3 at that location. The business relocations connected with PA-3 are nearly identical to those for PA-1 and would have similar impacts. PA-3 would have 25 more residential relocations than PA-1 due to the new alignment south of Riverside Drive. North of Riverside Drive the alignment of PA-3 is the same as PA-1.

Impacts of PA-4: PA-4 requires the relocation of the largest number of non-mobile home single-family residences or farmsteads of all of the Practical Alternatives.

The commercial displacements required for PA-4 are similar to those for PA-1 and PA-3, although slightly more jobs would be relocated. Almost all of the businesses relocated by PA-4 own their premises. As with PA-1 and PA-3, most of the businesses relocated by PA-4 should be able to find comparable sites. Few long-term job losses are anticipated as a result of PA-4.

The Charity Baptist Church, located 1.25 miles south of M-60, would be the only community facility relocated under PA-4.

Impacts of PA-5: PA-5 requires substantially fewer relocations than the freeway alternatives (PA-1 to PA-4). The one business impacted should be able to relocate to a similar location with minimal impact on employment.

Impacts of PA-5 MOD: PA-5 MOD would relocate seven residences and one business, the fewest relocations of any of the Build Alternatives. The one business impacted is a service station that should be able to relocate to a similar location with minimal impact on employment.

Availability of Replacement Property: In order to determine the availability of replacement housing and commercial property, 2000 Census Data for the affected communities was reviewed and local realtors serving the study area were contacted. According to the St. Joseph County Association of Realtors, 777 homes were sold through realtors in St. Joseph County in 2003 at an average price of \$107,580. According to the 2000 census, there were 755 vacant year round housing units (not seasonal units) in St. Joseph County. Local realtors in the Three Rivers and Constantine area indicated that supply exceeds demand, with many single-family homes sitting vacant for months. White Pigeon area realtors indicated that supply and demand are comparable. Adequate replacement housing of varying sizes and prices appears to be available for all of the Practical Alternatives' potential residential relocations. **Table 4.7** illustrates the availability of different types of housing within the study area according to the Multiple Listings Service at www.realtor.com as of May 2004. This table does not include private sales by owners or agents not affiliated with the web site.

Table 4.7 Houses Listed For Sale on the Multiple Listings Service at Realtor.Com

Housing Price Range/Type	Houses For Sale			
	White Pigeon Area	Constantine Area	Three Rivers Area	St. Joseph County
\$0 to \$50,000	3	2	20	41
\$50,000 to \$100,000	17	16	74	232
\$100,000 to \$150,000	19	17	55	180
\$150,000 to \$200,000	11	11	29	110
\$200,000+	23	6	28	111
1 Bedroom	0	1	7	12
2 Bedrooms	12	7	42	120
3 Bedrooms	30	25	113	336
4 Bedrooms	13	15	34	128
5 Bedrooms or more	9	4	16	70

Local realtors indicated that the supply of commercial property exceeds demand and that commercial space and available land zoned commercial often sits vacant for years. PA-2 is the only Build Alternative where finding adequate replacement commercial property may be difficult, due to the large number of commercial relocations.

Typically, impacted community facilities require rebuilding rather than relocation. Within the US-131 study area, adequate vacant land exists to rebuild all potentially impacted facilities at or near their existing locations.

Mitigation: Details on MDOT's general mitigation measures for relocations are found in **Section 4.30.1, Measures to Mitigate Right-Of-Way Acquisition and Relocation Impacts** and in the conceptual stage relocation plan found in **Appendix C**.

4.6 Economic Impacts

In general, the adverse economic effects of the project will be small: tax base loss, effects on businesses from relocations and changes in traffic patterns. Of all the alternatives, only PA-2 has substantial adverse economic impacts. This section discusses several categories of economic impact for the US-131 Practical Alternatives. As indicated in the **Traffic Report**, summarized in **Appendix A.1**, US-131 improvements would introduce higher levels of through traffic to the study area, providing further stimulus to economic growth. Improvements would also decrease travel time and may reduce accident costs, providing economic benefits to both local and through traffic. The construction of roadway improvements would also inject new money into the local and state economies during construction. However, similar, greater, or lesser economic benefits could be generated by investing in roadway projects in other locations in the state depending on the type of project and the amount of traffic using it. Adverse impacts of the Build Alternatives include loss of property tax revenues due to right-of-way (ROW) acquisition and potential reductions in area employment from relocated businesses choosing not to remain in the area. Potential bypasses of the Village of White Pigeon, the Village of Constantine, and the City of Three Rivers would affect existing business patterns.

A number of methodologies were utilized to assess the potential economic impact of US-131 improvements. A review of post-construction studies that have examined the economic impacts

of highway bypasses was conducted to identify the long-term economic impacts encountered by similar communities that have been bypassed. A survey of both business operators and patrons along existing US-131 was also conducted to gain insight into the perceived economic impacts of existing US-131. The potential benefits of improvements in the form of travel time savings and crash reductions were analyzed and estimates of the potential tax base loss due to ROW acquisition were also calculated.

The results of these assessments are summarized in this section to provide an overall analysis of the potential economic impacts of the Practical Alternatives.

Impact of a No-Build Alternative: The greatest influence on future economic conditions within the study area will be the overall health of area businesses and the condition of the state and national economies. The effects of US-131 improvements would be secondary under both the Build and No-Build scenarios. **Section 3.6, Economics** provides an overview of the current economic conditions within St. Joseph County, including unemployment that is below the state average and median household incomes that are also below the state average. Modest growth in population is forecast for the study area communities (**Table 3.1**), which should contribute to modest economic growth over the next twenty years. These trends should continue under a No-Build Alternative.

A survey of US-131 business operators and patrons was conducted to provide insight into the perceived impacts of existing US-131 on local businesses, and to assess how a No-Build Alternative would potentially affect these businesses. **Table 4.8** provides a summary of the perceptions of business operators regarding US-131 and the current business outlook in the study area. Detail on the survey methodology is contained in **Section 3.6, Economics**.

Table 4.8 Business Survey Perceptions on Existing Conditions

Impact of No-Build Alternative on Business	Have No Effect	Increase Business	Decrease Business	No Answer
White Pigeon Area	100%	0%	0%	0%
Constantine Area	70.8%	4.2%	20.8%	4.2%
Three Rivers Area	73.8%	7.7%	7.7%	10.8%
Total Study Area*	72.7%	5.5%	10.9%	10.9%
Major Concerns with Existing US-131**	Difficult to Cross	Traffic Congestion	"Too Many Trucks"	"Too Much Noise"
White Pigeon Area	11.1%	33.3%	33.3%	0%
Constantine Area	70.8%	58.3%	50.0%	29.2%
Three Rivers Area	49.2%	27.7%	16.9%	3.1%
Total Study Area*	47.3%	36.4%	26.4%	10.9%
Outlook for Business in the Next Ten Years	Good – Will Consider Expansion	Fair – Will Continue As Is	Poor – May Reduce Staff	Other/ No Answer
White Pigeon Area	33.3%	55.6%	0.0%	11.1%
Constantine Area	54.2%	41.7%	0.0%	4.2%
Three Rivers Area	84.6%	12.3%	0.0%	3.0%
Total Study Area*	70.9%	25.5%	0.0%	3.6%
* Study Area total includes listed areas and scattered businesses between communities.				
**Major issues cited only, will not add to 100% as multiple responses and other responses were allowed.				

Although many business operators were concerned with certain existing conditions associated with US-131, the majority of business operators do not feel the existing state of US-131 adversely impacts their business. The overall outlook for the study area businesses appears good. Thus, the overall perception is that the economic impact of the No-Build Alternative would not be substantial.

Impacts of Build Alternatives: The economic impact of a bypass of the Village of Constantine is a factor for all of the Build Alternatives. PA-3 and PA-4 would also bypass the cluster of business development located at US-131 and US-12; and PA-1, PA-3, and PA-4 would bypass parts of the commercial development located on US-131 in the City of Three Rivers. Literature review of the post-construction effects of highway bypasses previously constructed around small and mid-sized communities of comparable size to the Village of White Pigeon, the Village of Constantine, and the City of Three Rivers, supports the following conclusions. Reference sources are identified in the summary of the literature review contained in **Appendix A.2**.

- There is generally a larger short-term impact to highway-oriented establishments such as service stations, motels, and restaurants because of their higher dependence on through traffic. However, these same businesses are among those who can benefit most from short-term construction revenues being spent and re-spent within the community.
- There is no evidence that businesses targeting non-motorists or specialty markets are affected. In fact, when traffic whose origins and destinations lie outside of the community is routed away from the business area, congestion and conflict are reduced. This can create a more inviting shopping atmosphere for local repeat customers, upon whom most businesses depend.
- The long-term growth potential of a bypass has generally been found to outweigh the short-term economic impacts.
- Sales from through travelers account for a much smaller portion of total receipts than are commonly expected by local businesses.
- Any decline in business is typically much smaller than business owners had expected. Generally, business owners from all types of retail sales have tended to support bypasses following their completion.

The survey of business owners and patrons conducted for this study confirmed that many of these general findings were applicable for US-131. A key finding was that 55.5% of businesses surveyed felt that ten percent or less of their business came from unplanned stops by customers, while only 4.5% felt that more than half of their customers were drive-by patrons. **Table 4.9** provides greater detail of the responses from the business and patron surveys.

Table 4.9 Survey Results Concerning Impact of Bypassing Study Area Communities

Percentage of:	White Pigeon Area	Constantine Area	Three Rivers Area	Study Area Totals*
Trips by Patrons at US-131 Businesses from Through Traffic.**	14.3%	25.7%	15.1%	16.8%
Patrons at US-131 Businesses Who Were Aware of the Business and Planned to Stop.	81.0%	87.1%	93.5%	91.1%
Business Operators Who Felt a Bypass Would Hurt Their Business.***	33.3%	50.0%	38.5%	38.2%
Business Operators Who Felt a Bypass Would Help Their Business.***	22.2%	20.8%	10.8%	13.6%
Business Operators Who Felt a Bypass Would Have No Effect on Their Business.***	22.2%	20.8%	38.5%	31.8%
* Study Area total includes listed areas and scattered businesses between communities. ** Through trips are defined as those that neither originated from nor were destined for a community within the study area. ***Totals in columns do not add to 100% because of non-responses.				

The survey of business patrons showed that gasoline/service stations were more dependent on through traffic (24.7%) and on unplanned stops at their business (84.2% planned) than other businesses. These businesses may require some adaptation of service to avoid or minimize potential adverse effects of a Build Alternative on a new alignment.

The literature review and surveys both indicate that there would likely be some adverse impacts of bypass alternatives on existing businesses on US-131, especially for highway-oriented businesses. Business owners have concerns about the impact of the bypasses, although only a small percentage of the surveyed business patrons had not planned to stop at the business where they were surveyed. Constantine and White Pigeon area businesses were found to be more dependent on unplanned stops and through traffic than those in Three Rivers.

Potential Direct and Indirect Economic Benefits of US-131 Improvements: Improvements to US-131 would provide both direct and indirect economic benefits. Direct economic benefits would be those that result from improvements to the flow of traffic and reduced crashes on US-131. Improvements would have an economic value in terms of travel time saved, savings due to fewer vehicular crashes, and changes in vehicle operating costs. The level of direct economic benefit would depend on several factors including the following:

- Number of vehicles using a bypass. Generally economic benefits are higher for improvements to roadways with higher traffic volumes as more motorists experience the potential travel efficiency savings from improvements.

- The average speed on a bypass compared to the average speed on the existing roadway. A bypass which results in substantially higher average speeds will generally have greater economic benefits in terms of travel time savings.
- The length of a new roadway compared to the existing roadway. If a new roadway is substantially longer, total vehicle miles traveled will increase along with vehicle operating costs. If a new roadway is similar in length to the existing facility, total vehicle miles traveled would remain similar and could decrease if motorists are currently using lengthy alternate routes along local roads to bypass existing congestion. A decrease in total vehicle miles traveled would reduce vehicle operating costs and result in an economic benefit to motorists.
- The potential for crash reductions. If a new roadway eliminates intersections and upgrades the roadway to a type with a lower average crash rate (e.g., a freeway or controlled access facility), accident rates in the study area could be reduced. Reduction in crashes is most likely to occur when upgrading or bypassing a segment of roadway with higher than statewide average crash rates. However, future crash rates for any roadway can not be accurately estimated and can only be approximated based on averages for existing similar road types.

Overall economic benefits from US-131 improvements would be lower than those for several other potential projects in Michigan due to the lower traffic levels on US-131. Many roadways in Michigan carry several times the average daily traffic on US-131. However, all of the Build Alternatives will have some direct economic benefits.

The freeway Build Alternatives (PA-1 through PA-4) will have greater direct economic benefits than the non-freeway Build Alternatives (PA-5 and PA-5 MOD). As listed in **Table 4.22**, the freeway Build Alternatives also cost substantially more to construct than PA-5 and PA-5 MOD. The freeway Build Alternatives would result in higher average speeds and no intersections for most of the length of US-131 in the Study Area. As a result, motorists would benefit from reduced travel times. The bypasses for PA-5 and PA-5 MOD are shorter, would feature lower average speeds, and would still include several intersections. As a result, travel time savings would not be as large for PA-5 and PA-5 MOD.

Crash savings would likely be larger for the freeway Build Alternatives as freeways generally result in lower average crash rates, and the freeway Build Alternatives bypass some segments of US-131 with crash rates higher than statewide averages. Crash savings for PA-5 and PA-5 MOD would be minimal as they bypass parts of US-131 with lower than average crash rates.

There would be minimal benefits in terms of reduced vehicle operating costs from the Build Alternatives as all of the alternatives are slightly longer than existing US-131 and there are limited opportunities to use other existing roads to efficiently bypass existing areas experiencing periodic congestion.

Indirect economic benefits would result from the creation of new jobs and the investment of funds resulting from construction, ROW acquisition, the savings received as a part of the direct benefits of improvements, and an increase in through traffic. Companies and individuals receiving benefits in terms of reduced travel time and accident costs would also invest portions of these savings in the local and state economies.

When an investment is made in the construction of a new facility, the companies and individuals receiving payment for building the project would in turn spend the money they receive on other goods and services. The same holds true for money saved from travel time reductions or other benefits of a new highway. Economic activity and earnings resulting from construction would be temporary and would likely occur over a three to five year period, or over the course of a staged construction process. The duration of jobs resulting from construction investments would be limited to the construction time-frame. The number of jobs created would likely peak sometime into the construction process and then taper off to approximately the pre-construction level of employment once construction is completed. Local economic benefits from construction would depend in part on the availability of local materials and workers. MDOT seeks the best possible value from its investments when tendering construction projects and, like any other project, there is no guarantee local firms would be selected or local materials used. Many of the economic benefits due to the investment of construction dollars may be felt in other parts of Michigan than just St. Joseph County.

Indirect economic benefits from the reinvestment of travel time and crash savings would be spread out over a longer time period than the more immediate indirect economic benefits from construction. Any increase in jobs due to the travel time-savings would also be distributed over the lifetime of project improvements. As a high percentage of the users of US-131 in the study area are local, a large portion of the direct and indirect economic benefits of US-131 improvements would be felt locally. Benefits would also accrue to other Michigan and out-of-state motorists passing through the study area.

Each of the Build Alternatives is forecast to have both direct and indirect economic benefits for St. Joseph County and the State of Michigan. However, this analysis does not necessarily mean that the benefits of the US-131 alternatives are greater or less than those that would occur if MDOT invested its funds elsewhere. The benefits to the State of Michigan as a whole are less relevant than the benefits to St. Joseph County because using the funds for a project in another part of the state could result in similar, higher, or lower statewide benefits. Benefits to St. Joseph County are more relevant from a local economic development perspective than a statewide perspective. Given that US-131 carries less traffic than many other roadways in the state and that similar or greater economic benefits could be achieved by making similar investments elsewhere, US-131 improvements would not have major economic benefits from a statewide perspective.

Impacts on Local Tax Base and Job Losses due to ROW: All of the relocations discussed in **Section 4.5, Relocation Impacts**, along with the acquisition of ROW, would have potential short and long-term effects on property tax revenues for the communities involved. The short-term effect would be a loss of property taxes from parcels acquired by MDOT for ROW and from relocations that take time to complete. Over time, this lost property tax value should be replaced as many of the relocated businesses and residents would likely move to new locations within the study area communities, and new development would take place, raising the property tax values of currently vacant or underutilized property. **Table 4.10** presents estimates of potential short term tax base reductions due to ROW acquisition for each of the affected study area communities.

The Build Alternatives would not reduce the local tax base of any of the study area communities by more than two percent with the exception of PA-2, PA-3, and PA-4 in Mottville Township and PA-2 in the Village of White Pigeon. At 5.54% in Mottville Township and 8.11% in the Village of White Pigeon, the property tax impacts of PA-2 would be substantial. Between 1997 and 2000, the total taxable value for St. Joseph County rose by 20.3% according to data provided by the

Michigan State University Department of Agricultural Economics. This represents an average county-wide gain of 4.7% per year. At this rate of gain, tax base losses due to the acquisition of ROW for the Build Alternatives would be less than the annual gain in new taxable value for the rest of the communities affected. PA-5 and PA-5 MOD would have by far the least impacts in terms of reducing the local tax base in any of the study area communities. The property tax impacts for the alternatives other than PA-2 would not be nearly as great.

While any business relocations can alter business patterns in the short-term, the greater the number of business relocations, the harder it is for the local economy to adjust over time. As discussed in **Section 4.5, Relocation Impacts**, PA-2 requires 64 potential business relocations, including 38 in the White Pigeon area near the proposed US-131/US-12 interchange. These relocations represent over 1/3 of the study area businesses along US-131 and account for an estimated 680 jobs. The local economy would be substantially impacted as a result of these business relocations for PA-2 in terms of the short-term availability of services and employment and the long-term alteration of business patterns. PA-2 would also affect the local economy to a greater degree than would the other Build Alternatives in terms of tax base and job losses. For PA-2, it would be beneficial if the timetable for relocating businesses could be longer than would be required for the other Build Alternatives to ensure smooth replacement of existing services and employment. Other Build Alternatives would affect far fewer jobs as described in **Section 4.5**.

Table 4.10 Loss of Taxable Value for Study Area Communities due to ROW Acquisition

Community	Loss of Taxable Value due to ROW (2004)*														Total Taxable Value (2004) \$'000
	All dollars are in thousands														
	No-Build		PA-1		PA-2		PA-3		PA-4		PA-5		PA-5 MOD		
	\$'000	%	\$'000	%	\$'000	%	\$'000	%	\$'000	%	\$'000	%	\$'000	%	
Mottville Township	\$0	0.0%	\$182	0.46%	\$2,198	5.54%	\$898	2.25%	\$986	2.48%	\$2	0.01%	\$2	0.01%	\$39,694
White Pigeon Township	\$0	0.0%	\$88	0.07%	\$738	0.58%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$126,482
Village of White Pigeon	\$0	0.0%	\$112	0.45%	\$2,005	8.11%	\$0	0%	\$0	0%	\$0	0%	\$0	0%	\$24,717
Constantine Township	\$0	0.0%	\$1,006	1.09%	\$1,025	1.11%	\$1,049	1.14%	\$1,591	1.73%	\$104	0.11%	\$46	0.05%	\$92,077
Village of Constantine	\$0	0.0%	\$14	0.03%	\$14	0.03%	\$14	0.03%	\$0	0%	\$35	0.08%	\$29	0.06%	\$46,532
Fabius Township	\$0	0.0%	\$2,059	1.87%	\$1,950	1.77%	\$2,059	1.87%	\$1,751	1.59%	<\$1	0%	<\$1	0%	\$110,043
City of Three Rivers	\$0	0.0%	\$289	0.19%	\$1,595	1.07%	\$289	0.19%	\$304	0.20%	\$141	0.09%	\$141	0.09%	\$148,478
Lockport Township	\$0	0.0%	\$493	0.69%	\$419	0.58%	\$493	0.69%	\$493	0.69%	\$0	0%	\$0	0%	\$71,762

*
Loss of Taxable Value was based on the following assumptions.

- For parcels involving residential, farm, and business relocations the entire taxable value was counted unless other viable residences or businesses remained on the parcel.
- For parcels not involving relocations, buildings were assumed to count for 75% of the taxable value, which was not counted. Uncovered/unbuilt acreage was assessed and counted at an average taxable value of \$2,250 per acre. Taxable value is typically less than half of the market value of a property.
- Taxable values originally calculated in year 2000 dollars were calculated for 2004 values based upon an average annual 3.0% inflation factor.

Discussions were held with the St. Joseph County Land Resource Center staff and the local assessor for the majority of the communities involved to verify that the assumptions used in making these estimates were appropriate.

4.7 Joint Development Impacts

Joint development initiatives to enhance non-motorized transportation facilities and/or transit services, or to provide new parkland through right-of-way (ROW) acquisition, are not being incorporated as a part of the Practical Alternatives. The lack of density in land use within most of the areas impacted by the alternatives suggests that there would be little usage of non-motorized facilities built along the ROW in conjunction with a freeway. Relatively large percentages of heavy truck traffic would also make the PA-5 and PA-5 MOD alignments less attractive routes for non-motorized users. An examination of multi-modal transportation found no fixed route transit services operating within the study area and suggests that the population is too small and dispersed for any fixed transit facilities to be viable. Further discussion of transit services within the study area is found in **Section 2.2.1.2, Public Transit**.

The American Axle Plant in Three Rivers is currently working on a plan to expand their facility and enhance access to local roads and trunklines. Coordination discussions with regards to this plan have been held. The service drive access proposed for each of the freeway alternatives along with the nearby interchange proposed near Cowling Road would fit with the plan to provide better access for increased shipping and receiving at the American Axle facility. For all the reasons described above, the project will not have a substantial impact on any joint development initiatives.

4.8 Non-Motorized Facility Impacts

The existing US-131 study area alignment does not have sidewalks with the exception of the segment within the Village of Constantine. Since none of the Build Alternatives passes through downtown Constantine, pedestrian access to this area should improve as compared to the No-Build Alternative. The streetscape environment for pedestrians in downtown Constantine should be calmer and Washington Street (existing US-131) should be easier to cross. Minor pedestrian traffic, including joggers, utilizes some of the local roads that cross existing US-131 and each of the Build Alternatives. Access for pedestrians should improve where the mainline of PA-1 through PA-4 is bridged over local roads, especially if sidewalks are provided, as the difficulty in crossing US-131 would be reduced. Where minor roads are closed, either permanently or during construction, pedestrian access would be less direct.

The current US-131 facility is used minimally by bicyclists, as it does not feature non-motorized lanes. Relatively large percentages of heavy truck and wide load (mobile home) delivery trucks on this segment of US-131 also limits its attractiveness as a bicycle route. A series of "Bicycle Tours"/routes exist on local roads that cross US-131. These routes are unmarked but are published by the St. Joseph County Parks and Recreation Commission. The Build Alternatives impact these routes at varying locations as shown on **Figure 3.3 in Section 3.1.7, Institutional, Community Facilities, and Services**. These tours could be rerouted at all affected locations to minimize or eliminate impacts.

Overall, all of the Practical Alternatives will have little adverse effect on non-motorized use of the corridor, since there is little existing use of the corridor by pedestrians or bicycles, and in many cases, the pedestrian and bicycling environment will be improved by removal of vehicular traffic from local roads, particularly in downtown Constantine.

Impacts of the No-Build Alternative: The No-Build Alternative would not adversely impact any non-motorized facilities.

Impacts of PA-1 through PA-4: PA-1 through PA-4 would create both adverse and beneficial impacts on pedestrian and bicycle activity in the study area, however, as noted above, outside of the Village of Constantine, this activity is minimal. In the locations where these alternatives construct roadway on new alignments, the corresponding segment of existing US-131 would experience a sharp reduction in traffic, and would be more attractive for pedestrian or bicycle use. Conversely, for the freeway alternatives, US-131 would be a freeway that would prohibit pedestrians and bicycles from using US-131. In locations where the existing two-lane roadway is being replaced by a freeway on the same alignment, pedestrians and bicycles would lose a legal route for travel. Service drives would help to mitigate this effect. Pedestrians and bicycles would benefit from grade separations of the freeway, which would permit easier crossings of US-131. At the same time, they would also be adversely affected in areas where roads are closed off from the freeway with cul-de-sacs. Specific locations would be affected as follows:

- In the vicinity of the Villages of White Pigeon and Constantine, PA-1 through PA-4 cross Stears Road, North River Drive, Quarterline Road, and Millers Mill Road. Some of these roads would be terminated with a cul-de-sac at their respective crossings. This would impact non-motorized travel including pedestrians. PA-1 through PA-4 would be grade-separated at Dickinson Road, Riverside Drive, and Youngs Prairie Road. These bridged crossings should not impact any non-motorized uses except during construction.
- In the vicinity of the City of Three Rivers, PA-1 through PA-4 cross Broadway Road, Millard Road, Coon Hollow Road, and Hoffman Road. With the exception of the Coon Hollow crossing that terminates in a cul-de-sac, all of these road crossings would be grade-separated and there should be no adverse impacts on non-motorized or pedestrian use of the roads.

Impacts of PA-5: PA-5 would generally maintain existing access and roadway configurations, and would permit bicycle and pedestrian use through its entire length. Minor improvements to the roadway, such as new shoulders and current roadway geometrics should improve safety and comfort for those pedestrians and bicycles that choose to use the road. However, pedestrians and bicycles that use PA-5 would be exposed to higher traffic volumes on some segments than under a No-Build condition. As with the other alternatives, PA-5 would offer beneficial effects to pedestrians and bicycles in downtown Constantine as this area is bypassed and traffic is greatly reduced on existing US-131 at this location (**Figure 2.3, sheets 1 and 2**).

Some adverse impacts on bicycles and pedestrians would be experienced in the vicinity of the Villages of White Pigeon and Constantine. PA-5 would require the termination of Stears, Quarterline, and Youngs Prairie Roads with cul-de-sacs. These terminations would hinder non-motorized travel along these local roads.

Impacts of PA-5 MOD: This alternative would generally have similar effects as PA-5. However, under PA-5 MOD, the bypass of the village of Constantine would be substantially shorter, as the new alignment of US-131 would reconnect with the existing US-131 alignment at the existing right-angle turn of existing US-131 at Youngs Prairie Road (see **Figure 2.3 (sheets 1 and 2)**). The portion of existing US-131 north of the St. Joseph River within the Village of Constantine would be exposed to higher traffic volumes with PA-5 MOD improvements than with a No-Build condition.

4.9 Air Quality Impacts

The effects of the project on air quality have been assessed in the section that follows. As the project is in an attainment area and all alternatives would not exceed federal standards for air quality, no significant air quality impacts will result from the project.

4.9.1 Conformity

The study area is not within a designated air quality non-attainment area for any of the air pollutants for which the U.S. Environmental Protection Agency (USEPA) has established standards. A conformity determination under 40 CFR Part 93 (“Criteria and Procedures for Determining Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Funded or Approved under Title 23 U.S. Code of the Federal Transit Act”) is not required.

4.9.2 Carbon Monoxide Microscale Analysis

Microscale carbon monoxide (CO) analyses for different years were performed to determine if the project would exceed the National Ambient Air Quality Standards (NAAQS). The CO microscale dispersion analyses conducted are consistent with the mobile source emission factors for Michigan and those issued by the USEPA known as MOBILE5b and Conformity Regulations dated November 11, 1993 (40 CFR Part 93). The CAL3QHC computer model, Version 2.0 (USEPA, 1992) was the intersection model used for the CO dispersion analysis. CO concentrations were modeled in consideration of both the one-hour and eight-hour NAAQS, but the discussion below focuses on the eight-hour CO standard of 9.0 parts per million (ppm) since that standard is lower than the one-hour standard and is always the most critical standard for mobile-source CO emissions.

The CO concentrations were calculated for the maximum traffic volumes at representative “worst case” and “maximum” receptors for the years 2000 (existing), 2010 (estimated first year of potential operations), and 2025 (design year) for the No Build, PA-2, PA-5, and PA-5 MOD Alternatives, to model the alternatives with the highest likelihood for intersection delay at the study area’s lowest-performing intersection. The “worst case” location is the property with the highest volume of traffic closest to a residential-type receptor where occupants could be expected to remain for eight consecutive hours. The worst case location evaluated for this study is the Super 8 Motel located in the northeast quadrant of the intersection of US-131 and Broadway Road. “Maximum” receptors were identified as those locations where the highest CO concentrations would be expected to occur, regardless of whether the location could be expected to have human inhabitants. The location for maximum CO concentration is at the ROW line in the southeast quadrant of the intersection of US-131 and Broadway. The “maximum” and “worst case” locations are shown in **Figure 4.10 (sheets 1-4)** at the end of this **Section 4.0, Environmental Consequences**.

The highest levels of CO tend to occur with idling traffic, so the impacts for a new freeway on alignment would be expected to be less. For this reason, CO concentrations were calculated for the No-Build, PA-5, and PA-5 MOD Alternatives. Alternative PA-2 was modeled because its corridor would be adjacent to US-131 service drive in the vicinity of Broadway Road.) A default background CO concentration of 3.0 parts per million (ppm) was used for an eight-hour analysis to represent the contribution of other sources to the ambient CO in the area. In addition, a persistence factor of 0.7 was used per EPA guidance to reflect the fact that worst-case meteorological conditions would not be expected to persist for an eight-hour period.

The projected CO concentrations for the “worst case” and “maximum” receptors are shown in **Table 4.11**. The highest worst case and maximum CO values for receptors occurred under the Practical Alternative PA-2 scenario. The “worst case” and “maximum” CO values for PA-2 are below the NAAQS standard of 9.0 ppm. All other Practical Alternatives are likewise expected to be below the NAAQS standard of 9.0 ppm, and therefore no exceedance of the NAAQS is anticipated.

Dust Control: During the construction of any project, the contractor would be responsible for adequate dust-control measures so as not to cause detriment to the safety, health, welfare, or comfort of any person, or cause damage to any property, residence, or business.

Bituminous and Concrete Plants: All bituminous and portland cement concrete proportioning plants and crushers must meet the requirements of the rules of Part 55 of Act 451, Natural Resource and Environmental Protection. For any portable bituminous or concrete plant or crusher, the contractor must apply for a permit-to-install or a general permit from the Permit Section, Air Quality Division, of the MDEQ.

This permit-to-install should be applied for a minimum of 30 calendar days prior to the plant being installed for plants with an active MDEQ permit, (or 60 calendar days prior for plants not previously permitted in Michigan).

Dust collectors would be provided on all bituminous and concrete proportioning plants. Dry, fine aggregate material removed from the dryer exhaust by the dust collector would be returned to the dryer discharge unless otherwise directed by the engineer.

Table 4.11 Eight-Hour Carbon Monoxide Concentrations (ppm) for the Maximum and Worst-Case Receptor Location at US-131 and Broadway Road

Year	No-Build Alternative		Build Alternative PA-2	
	Maximum	Worst-Case	Maximum	Worst-Case
2000 – Existing	3.6	3.1	--	--
2010 – Potential First Year of Operation	3.6	3.1	4.6	3.5
2025 – Design Year	3.8	3.2	4.5	3.7

4.9.3 Mitigation of Traffic-Generated Air Quality Impacts

Despite increases in traffic volumes, the study area air quality is not projected to exceed the NAAQS. Therefore, air quality mitigation measures are not required for the proposed highway improvements.

4.9.4 Mitigation of Temporary Construction Air Impacts

During construction, the contractors must comply with all federal, state, and local laws and regulations pertaining to the control of air pollution. Adequate airborne dust control measures will be incorporated into the project and maintained, so as not to cause damage to properties or cause detriment to the safety, health, welfare, or comfort of any person.

All bituminous and portland cement concrete proportioning plants and crushers will meet the requirements of Part 55 of Act 451, Natural Resources and Environmental Protection. For any portable bituminous or concrete plant or crusher, the contractor must apply for a permit-to-install from the Permit Section, Air Quality Division, of the Michigan Department of Environmental Quality (MDEQ). Dust collectors must also be provided on all bituminous plants.

4.10 Noise Impacts

4.10.1 Noise Assessment Guidelines

A traffic noise assessment was performed in accordance with Federal Highway Administration (FHWA) procedures *23 CFR Part 772* and the *Michigan Department of Transportation's Highway Traffic Noise Analysis and Abatement Policy (July 2003)*. The assessment identified existing and potential traffic noise impacts.

In this Draft EIS phase of the project, a simplified modeling effort has been undertaken to evaluate the overall number of affected properties affected by different Practical Alternatives as well as the No-Build Alternative. In all cases, the No-Build Alternative adversely affects more properties than any of the Practical Build Alternatives.

To establish existing and future noise levels, the FHWA's TNM Look-Up Tables (TNMLOOK) were utilized. These tables have pre-calculated noise levels based upon distance from traffic and the volume and speed of traffic. A preliminary calculation of noise levels is provided without monitoring or extensive computer modeling. A more detailed analysis will be performed by modeling with the Traffic Noise Model (TNM version 2.5) once a Recommended Alternative has been identified for the Final Environmental Impact Statement (FEIS). At that time, any potential mitigation requirements will also be considered for the Recommended Alternative.

As described in greater detail in **Section 3.10, Noise**, the FHWA has established traffic Noise Abatement Criteria (NAC) for use in identifying the potential effect of noise on different classes of property, and defines how noise levels approach or exceed the NAC. **Section 3.10, Noise** also defines and describes the effect of various dBA sound levels as utilized for measuring sound. It should be noted that MDOT considers a noise level of 66 dBA to be a noise impact under NAC B since it approaches (comes within 1 dBA) of the 67dBA NAC B.

4.10.2 Traffic Generated Noise Impacts

Tables 4.12a and 4.12b provide a summary of the properties calculated to have existing and/or future noise levels that approach or exceed the NAC under the No-Build and Build scenarios. For clarity, both tables also include a comparison of the predicted noise levels with both the FHWA noise abatement criteria and the existing noise levels. Both NAC B (includes residences and parks) and NAC C (includes commercial and industrial) properties are shown. The affected properties in **Table 4.12a** are broken down by segment to provide an indication of the noise impacts in different parts of the study area. These segment locations are described in the table and illustrated on the **Appendix E** foldout map at the back of this document.

Table 4.12a Existing and Future Noise Levels Impacting Receptors in the Corridor

	NAC Type	NAC $L_{eq}(1h)$ dBA	Number of Receptors Approach/Exceed NAC				Total Receptors that Approach/ Exceed NAC
			Segment A*	Segment B*	Segment C*	Segment D*	
Existing	B	66	14	138	0	0	152
	C	71	0	0	0	0	0
2025 No-Build	B	66	20	155	1	0	176
	C	71	0	0	0	0	0
2025 PA-1	B	66	4	1	1	0	6
	C	71	0	0	0	0	0
2025 PA-2	B	66	3	3	3	1	10
	C	71	0	0	0	1	1
2025 PA-3	B	66	3	3	3	1	10
	C	71	1	0	0	0	1
2025 PA-4	B	66	2	0	6	1	9
	C	71	0	0	0	0	0
2025 PA-5	B	66	8	5	1	0	14
	C	71	0	0	0	0	0
2025 PA-5 Modified	B	66	0	50	0	0	50
	C	71	0	0	0	0	0

***Segment Locations**
***Segment A** - White Pigeon Area: From southern project terminus to Dickinson Road
***Segment B** - Constantine Bypass: From Dickinson Road to Gleason Road
***Segment C** - Three Rivers South: From Gleason Road to Hoffman Road
***Segment D** - Three Rivers North: From Hoffman Road to one-mile north of Cowling Road

Note: As described in **Section 3.10, Noise**, NAC Type B criteria address exterior sound levels for residences, parks, and institutional uses; Type C uses include exterior sound levels for commercial and other more highly developed uses.

Impacts of a No-Build Alternative: As **Tables 4.12a and 4.12b** indicate, the predicted No-Build design year 2025 traffic noise levels will approach or exceed 67 dBA for approximately 176 residential locations (NAC Category B) from the approximate same number of 249 sensitive receptor locations identified. Traffic noise levels will not approach or exceed 72 dBA at any developed land (commercial, industrial, and manufacturing) locations (NAC Category C).¹ In comparison, the existing 2003 traffic noise levels will approach or exceed 67 dBA for approximately 152 residential locations (NAC Category B) identified. In addition, the traffic noise levels will not approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at any developed land locations (NAC Category C), for any of the identified potential sensitive receptor locations. Compared to the other Alternatives, the No-Build has the most residential noise impacts, largely because of the bypass of the denser residential developments around the Village of Constantine.

¹ The noise levels used for comparison are 67 dBA and 72 dBA for Categories B and C respectively. Much of the information had been defined in **Section 3.10**.

Table 4.12b Traffic Noise Analysis Summary of the Inventory of Potentially Impacted Properties

Property Type: FHWA Land Use Category "B" Properties		
Existing US 131 2003 Traffic Levels		152 Properties Potentially Impacted with Noise Levels of 66 dBA or Higher under Existing Conditions
No Action Alternative – 2025 Traffic Levels		176 Properties Potentially Impacted with Noise Levels of 66 dBA or Higher under the No Action Alternative
Practical Alternative 1 - 2025 Traffic Levels		6 Properties Potentially Impacted with Noise Levels of 66 dBA or Higher by PA-1
Practical Alternative 2 - 2025 Traffic Levels		10 Properties Potentially Impacted with Noise Levels of 66 dBA or Higher by PA-2
Practical Alternative 3 - 2025 Traffic Levels		10 Properties Potentially Impacted with Noise Levels of 66 dBA or Higher by PA-3
Practical Alternative 4 - 2025 Traffic Levels		9 Properties Potentially Impacted with Noise Levels of 66 dBA or Higher by PA-4
Practical Alternative 5 - 2025 Traffic Levels		14 Properties Potentially Impacted with Noise Levels of 66 dBA or Higher by PA-5
Practical Alternative 5 Modified - 2025 Traffic Levels		50 Properties Potentially Impacted with Noise Levels of 66 dBA or Higher by PA-5 Modified
Property Type: FHWA Land Use Category "C" Properties		
Existing US 131 2003 Traffic Levels		0 Properties Potentially Impacted with Noise Levels Equal or Greater than 72 dBA under Existing Conditions
No Action Alternative - 2025 Traffic Levels		0 Properties Potentially Impacted with Noise Levels Equal or Greater than 72 dBA under the No Action Alternative
Practical Alternative 1 - 2025 Traffic Levels		0 Properties Potentially Impacted with Noise Levels Equal or Greater than 72 dBA by PA-1
Practical Alternative 2 - 2025 Traffic Levels		1 Property Potentially Impacted with Noise Levels Equal or Greater than 72 dBA by PA-2
Practical Alternative 3 - 2025 Traffic Levels		0 Properties Potentially Impacted with Noise Levels Equal or Greater than 72 dBA by PA-3
Practical Alternative 4 - 2025 Traffic Levels		0 Properties Potentially Impacted with Noise Levels Equal or Greater than 72 dBA by PA-4
Practical Alternative 5 - 2025 Traffic Levels		0 Properties Potentially Impacted with Noise Levels Equal or Greater than 72 dBA by PA-5
Practical Alternative 5 Modified - 2025 Traffic Levels		0 Properties Potentially Impacted with Noise Levels Equal or Greater than 72 dBA by PA-5 Modified
Footnotes:		
Property Type:		
FHWA Categories in accordance with 23 CFR Part 772.		
Category B Properties: A number of Category B Properties are currently being impacted under existing conditions with 2003 traffic levels, and will continue to be impacted under the No Action Alternative, with 2025 traffic levels. Because there are so many, the individual properties are not listed, but rather they are grouped by the noted street boundaries		

Impacts of Practical Alternative 1 (PA-1): As **Tables 4.12a** and **4.12b** indicate, the predicted PA-1 design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA for approximately 6 residential locations (NAC Category B) from the approximate same number of 24 sensitive receptor locations identified. Traffic noise levels will not approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at any developed land locations (NAC Category C), for any of the approximately 11 identified potential sensitive receptor locations.

Impacts of Practical Alternative 2 (PA-2): According to **Tables 4.12a** and **4.12b**, the predicted PA-2 design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA for approximately 10 residential locations (NAC Category B) from the approximate same number of 27 sensitive receptor locations identified. Traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at approximately 1 developed land (commercial, industrial, and manufacturing) locations (NAC Category C) out of approximately 11 identified sensitive receptor locations.

Impacts of Practical Alternative 3 (PA-3): As **Tables 4.12a** and **4.12b** indicate, the predicted PA-3 design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA for approximately 10 residential locations (NAC Category B) from the approximate same number of 13 sensitive receptor locations identified. Traffic noise levels will not approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at any developed land location (NAC Category C), out of approximately 2 identified sensitive receptor locations.

Impacts of Practical Alternative 4 (PA-4): According to **Tables 4.12a** and **4.12b**, the predicted PA-4 design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA for approximately 9 residential locations (FHWA Land Use Category B Properties) from the approximate same number of 12 sensitive receptor locations identified. Traffic noise levels will not approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at any developed land location (NAC Category C), out of approximately 1 identified sensitive receptor locations.

Impacts of Practical Alternative 5 (PA-5): As **Tables 4.12a** and **4.12b** indicate, the predicted PA-5 design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA for approximately 14 residential locations (FHWA Land Use Category B Properties) from the approximate same number of 35 sensitive receptor locations identified. The traffic noise levels did not approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at any developed land locations (FHWA Land Use Category C), out of approximately 19 identified sensitive receptor locations.

Impacts of Practical Alternative 5 Modified (PA-5 MOD): According to **Tables 4.12a** and **4.12b**, the predicted PA-5 MOD design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA for approximately 50 residential locations (FHWA Land Use Category B Properties) from the approximate same number of 117 sensitive receptor locations identified. The traffic noise levels did not approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at any developed land locations (FHWA Land Use Category C), out of approximately 0 identified receptor locations.

Impacts of Build Alternatives Summary: Properties that will be displaced by the Build Alternatives are not included in the assessment of noise impacts. The number of properties with calculated noise levels approaching NAC B (including residences, parks, and institutional uses) would drop dramatically under all Build Alternatives from the existing and future No-Build conditions. A new roadway alignment would reduce traffic noise that currently impacts a large

number of properties along existing US-131 in the Village of Constantine, by relocating through traffic to areas of lower development density. Along the new alignments, residences would generally be located further from the roadway than they are along the existing alignment. Overall, PA-1 would impact the fewest Category B properties of all Build Alternatives (6), and PA-5-MOD would impact the most (50). Note that all Build Alternatives would have less impact than the No-Build Alternative, largely because of the bypass of the denser residential developments around the Village of Constantine.

The PA-2 Alternative is the only alternative that would affect a commercial and industrial Category C property. Category C properties typically are commercial or industrial properties where traffic noise levels are not as much of a concern as with Category B properties because no identified outside human activity was identified as receptors of the noise for Category C properties.

4.10.3 Construction Noise Impacts

During construction of highway improvements, the noise generated by construction equipment can vary greatly, depending on the equipment type and model, type and length of work in progress, and atmospheric conditions. Typical noise levels at 50 feet would vary between 75 and 95 dBA. It is important to note that construction noise levels refer to instantaneous maximum noise levels, as opposed to hourly average sound levels (L_{eq}) used to describe traffic noise. The highest noise levels would occur during loud operations such as pile driving or breaking concrete.

Variations in building distances and land uses, as well as the intensity and timing of specific construction activities, will cause the exposure and level of impacts to vary. Adverse impacts from construction noise are anticipated to be localized, temporary, and transitory.

4.10.4 Mitigation of Traffic Noise

FHWA regulations require that after the identification of traffic noise impacts, an examination of potential mitigation measures be conducted as shown in **Figure A.2 (pages 1-8)** in **Appendix A.5**. Based on this examination, reasonable and feasible noise mitigation measures will be incorporated into the highway project, if required. FHWA regulations do not require that noise abatement criteria be met in every instance, but rather that every reasonable and feasible effort is made to provide noise mitigation when the criteria are approached or exceeded.

Where appropriate, the standard method of mitigating traffic noise impacts is constructing a noise barrier. Noise barriers are typically earthen berms and/or vertical walls provided for zoned residential land uses and institutional structures, such as hospitals, libraries, schools, and churches.

Mitigation Examination of Practical Alternative 1 (PA-1): As **Tables 4.12a** and **4.12b** indicate, the predicted PA-1 design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA at approximately 6 residential locations (NAC Category B) compared to approximately 24 sensitive receptor locations identified. Traffic noise levels will not approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at any developed land locations (NAC Category C) compared to approximately 11 identified potential sensitive receptor locations identified. However, installation of a noise barrier at the 6 residential locations is not a feasible or reasonable improvement. Since the residential locations are widely spaced apart, any noise barrier would provide shielding at only one location per

barrier. As a result, Mitigation Measures are not warranted for any of the approached or exceeded noise receptors that were identified for this alternative.

Mitigation Examination of Practical Alternative 2 (PA-2): As **Tables 4.12a** and **4.12b** indicate, the predicted PA-2 design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA at approximately 10 residential locations (NAC Category B) compared to approximately 27 sensitive receptor locations identified. Traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at 1 developed land location (NAC Category C) compared to approximately 11 identified potential sensitive receptor locations identified. However, installation of a noise barrier at the 6 residential locations is not a feasible or reasonable improvement. Since the residential locations are widely spaced apart, any noise barrier would provide shielding at only one location per barrier. As a result, Mitigation Measures are not warranted for any of the approached or exceeded noise receptors that were identified for this alternative.

Mitigation Examination of Practical Alternative 3 (PA-3): As **Tables 4.12a** and **4.12b** indicate, the predicted PA-3 design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA at approximately 10 residential locations (NAC Category B) compared to approximately 13 sensitive receptor locations identified. Traffic noise levels will not approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at any developed land locations (NAC Category C) compared to approximately 2 identified potential sensitive receptor locations identified. However, installation of a noise barrier at the 6 residential locations is not a feasible or reasonable improvement. Since the residential locations are closely spaced, any noise barrier would require openings in the barrier segment for driveway access resulting in an ineffective noise barrier. As a result, Mitigation Measures are not warranted for any of the approached or exceeded noise receptors that were identified for this alternative.

Mitigation Examination of Practical Alternative 4 (PA-4): As **Tables 4.12a** and **4.12b** indicate, the predicted PA-4 design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA at approximately 9 residential locations (NAC Category B) compared to approximately 12 sensitive receptor locations identified. Traffic noise levels will not approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at any developed land locations (NAC Category C) compared to approximately 1 identified potential sensitive receptor locations identified. However, installation of a noise barrier at the 6 residential locations is not a feasible or reasonable improvement. Since the residential locations are closely spaced with many cross street openings would require openings in the barrier segment for cross street access resulting in an ineffective noise barrier. As a result, Mitigation Measures are not warranted for any of the approached or exceeded noise receptors that were identified for this alternative.

Mitigation Examination of Practical Alternative 5 (PA-5): As **Tables 4.12a** and **4.12b** indicate, the predicted PA-5 design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA at approximately 14 residential locations (NAC Category B) compared to approximately 35 sensitive receptor locations identified. Traffic noise levels will not approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at any developed land locations (NAC Category C) compared to approximately 19 identified potential sensitive receptor locations identified. However, installation of a noise barrier at the 6 residential locations is not a feasible or reasonable improvement. Since the residential locations are widely spaced apart, any noise barrier would provide shielding at only one location per barrier. As a result, Mitigation Measures are not warranted for any of the approached or exceeded noise receptors that were identified for this alternative.

Mitigation Examination of Practical Alternative 5-Modified (PA-5-Modified): As **Tables 4.12a and 4.12b** indicate, the predicted PA-5-Modified design year 2025 traffic noise levels will approach or exceed the FHWA noise abatement criteria (NAC) of 67 dBA at approximately 50 residential locations (NAC Category B) compared to approximately 117 sensitive receptor locations identified. Traffic noise levels will not approach or exceed the FHWA noise abatement criteria (NAC) of 72 dBA at any developed land locations (NAC Category C) compared to approximately 0 identified potential sensitive receptor locations identified. However, installation of a noise barrier at the 6 residential locations is not a feasible or reasonable improvement. Since the residential locations are closely spaced with many cross street openings would require openings in the barrier segment for cross street access resulting in an ineffective noise barrier. As a result, Mitigation Measures are not warranted for any of the approached or exceeded noise receptors that were identified for this alternative.

Current MDOT criteria for noise abatement (2003) and the applicability of these criteria to provide abatement for affected receptors will be considered for the Recommended Alternative in detail and documented in the FEIS.

4.10.5 Mitigation of Construction Noise

Construction noise would be minimized by the use of mufflers on construction equipment. Air compressors would meet the federal noise level standards and would, if possible, be located away, or shielded from, residences and other sensitive noise receptors.

4.11 Groundwater and Irrigation Impacts

4.11.1 Impacts on Groundwater

As described in greater detail in this section, the Build Alternatives will have a minimal effect on groundwater resources. MDOT specifications imposed on contractors will use Best Management Practices to avoid effects on wells, sewer lines, and recharge areas, as well as to protect surface water sources (covered in subsequent sections of this chapter). Therefore, the project will not have a significant effect on groundwater. The alignments of Practical Alternatives have been refined to minimize effects on center-point irrigation equipment and land, and no Practical Alternatives will have a significant effect on these resources, which will be mitigated as necessary.

Impacts of a No-Build Alternative: The No-Build Alternative would not introduce any new pollutants into groundwater sources through spills during construction, or reduce the rate of groundwater recharge due to greater runoff as a result of an increase in impervious pavement. To the extent that traffic increases within the US-131 study area, there could be an increase in discharged pollutants related to spills from motorized vehicles and everyday pavement pollution runoff. The No-Build Alternative would not impact existing well heads and no groundwater impacts are anticipated.

Impacts of Build Alternatives: The Build Alternatives would have minimal impact on groundwater resources. Direct impacts that permanently impair the function of groundwater discharge and recharge areas occur from roadway projects primarily due to impervious road surfaces that cover these areas. Groundwater resources are also vulnerable to temporary, direct impacts such as contamination at water wells, septic fields, and sewer lines during construction.

In Indiana, proposed improvements for the freeway Build Alternatives would include minor widening of existing US-131. PA-5 and PA-5 MOD would utilize existing ROW. No impacts to the designated sole source St. Joseph Aquifer in Elkhart County are anticipated because much of this aquifer is greater than 300 feet below the ground surface. No US-131 bridge structures are proposed in Indiana, and no piles requiring deep penetration of subsoils are proposed. There would also be no major impacts to wetland or groundwater recharge areas, major disturbances to groundwater flow or drainage patterns, or other impacts that would foster greater opportunity for contamination or disturbance of groundwater resources. No detention/retention ponds are currently anticipated, however these would also not be expected to impact groundwater resources.

4.11.2 Wells and Groundwater

Impacts of a No-Build Alternative: The No-Build Alternative would not impact any irrigation or potable water wells.

Impacts of Build Alternatives: In general, the Build Alternatives would have minimal impact on groundwater resources. No identified municipal water wells would be impacted by the ROW for any of the Build Alternatives.

4.11.3 Mitigation of Groundwater Impacts

Sealing water wells and sewer lines for the protection of groundwater quality is ensured by MDOT specifications imposed on construction contractors. Impacts on groundwater resources would be minimized where infringement on wetlands, seeps, and discharge areas is likely to occur. Further detail on mitigation for impacts to groundwater resources is located in **Section 4.30.3, Groundwater Quality Mitigation**.

4.12 Wetland Impacts

As described in greater detail below, all Practical Alternative alignments have been formulated to avoid and minimize impacting wetland areas to the greatest degree possible, particularly high-value wetlands that may harbor threatened or endangered species. Impacts that are unavoidable will be mitigated, with a higher acreage of mitigation area than the area impacted. Based on the type, quality, and amount of wetlands impacted, Practical Alternatives 1, 2, 3, and 4 will have a substantially greater impact on wetlands than PA-5 and PA-5 MOD. PA-4 impacts over twice the total wetland acreage of all other alternatives and it impacts the greatest acreage of forested and high quality wetlands as well. All other Build Alternatives have moderate to low wetland impacts.

Wetland types within the study area include a combination of floodplain forest, forest, emergent, scrub-shrub, and unconsolidated bottom communities. Wetlands within the study area were identified using the methodology described in the *Michigan Department of Environmental Quality (MDEQ) Wetland Identification Manual: A Technical Manual for Identifying Wetlands in Michigan* to determine both the presence and extent of wetlands within the study area. Within the study area, 32 wetland areas were identified, 31 of which were delineated and assessed. Boundaries for one wetland complex were determined based upon available National Wetland Inventory mapping, soils maps, and aerial photography due to a lack of access (Wetland 30). No wetlands were identified or would be impacted within the Indiana portion of the study area. One or more of the Build Alternatives would impact 25 of the 31 identified wetland areas. Each of the Build Alternatives would impact wetlands regulated pursuant to Part 303, Wetland

Protection, of the Natural Resources and Environmental Protection Act (NREPA), PA 451 as amended. The regulatory status of each wetland was not considered in assessing functions, benefits, uses, or impacts, as MDOT proposes that all impacted wetlands would be mitigated.

The wetlands were classified utilizing the *Classification of Wetlands and Deepwater Habitats of the United States* (1979) Cowardin, et al. for the U.S. Fish and Wildlife Service. Functional assessments of the quality and function of each wetland were also performed using the Wisconsin Department of Natural Resources *Rapid Assessment Methodology for Evaluating Functional Values* (1987) as a starting point, and making a further determination of high, moderate, or low value using an assessment methodology described in detail in **Section 3.12, Wetlands. Table 4.13** provides a summary of the wetland impacts of each Build Alternative by segment to allow for a comparison of impacts in different areas of the project. **Figure 4.10 (sheets 1-4)** at the end of this section illustrates the location of wetlands in relation to the Build Alternatives.

All Build Alternatives were developed to avoid impacts to the Stag Lake Bog, Old Cranberry Bog, and the fen complex associated with Kerr Creek, a tributary to the Rocky River. All of the Build Alternatives cross the floodplain forests associated with the White Pigeon and St. Joseph Rivers; these potential crossings were located to provide near perpendicular river crossings at the narrowest floodplain locations feasible in order to minimize impacts to the floodplains and associated wetlands. Utilization of these measures minimized impacts to the high quality wetlands that possess high quality vegetative communities, provide significant wildlife habitat, or are considered rare communities within the State of Michigan.

Impacts of a No-Build Alternative: The No-Build Alternative would not impact any wetlands.

Impacts of PA-1: PA-1 would potentially impact a total of 16.24 acres of wetland associated with 15 wetland complexes. Six wetland complexes would be partially impacted, three bisected, and six would be removed by this alternative.

PA-1 impacts 4.42 acres of high quality wetland located in two complexes (Wetlands 3 and 8). Both of these high quality wetlands are floodplain forest and perform many functions such as floodwater conveyance and storage capacity, groundwater recharge/discharge, sediment/nutrient filtering, provision of aesthetic value, and provision of habitat for fish and wildlife. Both of these high quality wetlands have potential habitat for listed threatened and endangered species. **Section 4.20, Threatened and Endangered Species Impacts** discusses impacts to these and other potential habitats in greater detail; no endangered species were observed for any alternative, but there were sightings of a limited number of state threatened and special concern species. One of the impacted high quality wetlands is located at the existing US-131 crossing of the White Pigeon River (wetland 3) and is bisected by both the existing and PA-1, alignment. Although some loss of wildlife habitat would be expected, PA-1 would not create extensive impacts to the functions performed by this wetland. The second high quality wetland impacted by PA-1 is located along the St. Joseph River (wetland 8). This wetland is located within a relatively undisturbed floodplain forest of importance to the watershed. PA-1 bisects this wetland as a part of a new floodplain crossing and would result in some loss of all of the functions discussed above.

The moderate quality wetlands that would be impacted by PA-1 perform many of the same functions as the impacted high quality wetlands and are a mixture of floodplain forest, forest, and emergent wetland complexes. Moderate quality wetlands include Wetlands 18, 21, 27, 28, 29, 30, and 31. Functions fulfilled by the forested wetlands (wetlands 18, 21, 27, 28, 29, and 31) include provision of wildlife habitat, sediment/nutrient filtering, and aesthetic values.

Functions fulfilled by an emergent wetland complex (wetland 30) include sediment/nutrient filtering and shoreline protection.

The low quality wetlands impacted by PA-1 are primarily ditches or emergent complexes (wetlands 1, 7, 19, 20, 25, and 26). Primary functions fulfilled by these wetlands include floodwater conveyance, filtering of sediment and nutrients, and minimal stormwater storage. PA-1 has the lowest total impact on wetland acreage and the lowest impact on high quality wetlands of any of the freeway Build Alternatives (PA-1 through PA-4).

Impacts of PA-2: PA-2 would potentially impact a total of 22.43 acres of wetland located within 13 wetland complexes. Seven wetland complexes would be partially impacted, four bisected, and two would be removed by this alternative.

PA-2 impacts 6.59 acres of high quality wetland located in the same two floodplain forest wetland complexes impacted by PA-1 (wetlands 3 and 8). The impacts to the functions of the high quality wetlands would be similar to those for PA-1, although PA-2 impacts more acreage and more habitat at the existing US-131 crossing of the White Pigeon River due to the freeway section and proposed service drive at this location.

The moderate and low quality wetlands impacted by PA-2 have similar functions to those impacted by PA-1. Moderate quality wetlands include wetlands 15, 16, 21, 22, 24, 29, 30, and 31. Functions fulfilled by the forested wetlands (wetlands 21, 22, 24, 29, and 31) include provision of wildlife habitat, sediment/nutrient filtering, and aesthetic values. Functions fulfilled by emergent wetlands and depressional wetlands (wetlands 15, 16, and 30) include provision of floodwater storage, sediment/nutrient filtering, wildlife habitat, and shoreline protection (wetland 30).

The low quality wetlands impacted by PA-2 are primarily ditches or depressional areas (wetlands 1, 7, and 23). The primary function fulfilled by these wetlands is provision of floodwater conveyance with minimal stormwater storage.

Although PA-2 impacts the fewest wetland sites of any of the freeway Build Alternatives, it impacts more wetland acreage than PA-1.

Table 4.13 Wetland Impacts by Alternative and Segment*

Alternatives/ Segments		# of Wetland Complexes Impacted	Acres of Impact	Acres of Wetland Impacted by Type				Acres of Wetland Impacted by Quality**		
				Floodplain Forest	Forested	Emergent/ Scrub Shrub	Unconsolid- ated Bottom	High Quality	Moderate Quality	Low Quality
No-Build	Segment A	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts
	Segment B									
	Segment C									
	Segment D									
	No-Build Total	0	0	0	0	0	0	0	0	0
PA-1	Segment A	2	2.67	2.52	0.15	-	-	2.52	-	0.15
	Segment B	3	2.19	1.90	-	0.29	-	1.90	0.12	0.17
	Segment C	9	9.73	-	9.36	0.37	-	-	7.75	1.98
	Segment D	1	1.65	1.65	-	-	-	-	1.65	-
	PA-1 Total	15	16.24	6.07	9.51	0.66	-	4.42	9.52	2.30
PA-2	Segment A	2	4.84	4.69	0.15	-	-	4.69	-	0.15
	Segment B	3	2.19	1.90	-	0.29	-	1.90	0.12	0.17
	Segment C	7	13.75	-	11.53	1.51	0.71	-	13.04	0.71
	Segment D	1	1.65	1.65	-	-	-	-	1.65	-
	PA-2 Total	13	22.43	8.24	11.68	1.80	0.71	6.59	14.81	1.03
PA-3	Segment A	4	9.56	7.29	2.27	-	-	7.29	2.20	0.07
	Segment B	2	2.02	1.90	-	0.12	-	1.90	0.12	-
	Segment C	9	9.73	-	9.36	0.37	-	-	7.75	1.98
	Segment D	1	1.65	1.65	-	-	-	-	1.65	-
	PA-3 Total	16	22.96	10.84	11.63	0.49	-	9.19	11.72	2.05
PA-4	Segment A	4	9.56	7.29	2.27	-	-	7.29	2.20	0.07
	Segment B	3	3.55	3.21	-	0.34	-	3.21	0.12	0.22
	Segment C	11	43.11	-	39.23	3.88	-	-	39.46	3.65
	Segment D	1	1.65	1.65	-	-	-	-	1.65	-
	PA-4 Total	19	57.87	12.15	41.50	4.22	-	10.50	43.43	3.94
PA-5	Segment A	-	-	-	-	-	-	-	-	-
	Segment B	2	0.51	0.50	-	0.01	-	0.50	-	0.01
	Segment C	0	-	-	-	-	-	-	-	-
	Segment D	0	-	-	-	-	-	-	-	-
	PA-5 Total	2	0.51	0.50	-	0.01	-	0.50	-	0.01
PA-5 MOD	Segment A	-	-	-	-	-	-	-	-	-
	Segment B	2	0.51	0.50	-	0.01	-	0.50	-	0.01
	Segment C	-	-	-	-	-	-	-	-	-
	Segment D	-	-	-	-	-	-	-	-	-
	PA-5 MOD Total	2	0.51	0.50	-	0.01	-	0.50	-	0.01
<p>* Segment A - White Pigeon Area: From southern project terminus to Dickinson Road * Segment B - Constantine Bypass: From Dickinson Road to Gleason Road * Segment C - Three Rivers South: From Gleason Road to Hoffman Road * Segment D - Three Rivers North: From Hoffman Road to one-mile north of Cowling Road Wetland classification based on the <i>Classification of Wetlands and Deepwater Habitats of the United States</i> (1979) developed by Lewis A. Cowardin, et al **Quality determined using the Wisconsin Department of Natural Resources <i>Rapid Methodology for Evaluating Functional Values</i> (1992).</p>										

Impacts of PA-3: PA-3 would potentially impact a total of 22.96 acres of wetland located within 16 wetland complexes. Seven wetland complexes would be partially impacted, four bisected, and five would be removed by this alternative.

PA-3 impacts 9.19 acres of high quality wetlands located in three complexes (wetlands 4, 6, and 8). The high quality wetlands impacted by PA-3 have similar functions as those discussed for PA-1 and PA-2, since these wetlands are also floodplain forest. Functions being performed include floodwater conveyance and storage capacity, groundwater recharge/discharge, sediment/nutrient filtering, providing aesthetic value, and providing habitat for fish and wildlife. These high quality wetlands have potential habitat for listed threatened and endangered species. **Section 4.20, Threatened and Endangered Species Impacts** discusses impacts to these and other potential habitats in greater detail. PA-3 bisects floodplain forest wetland complexes on both sides of the White Pigeon River (wetlands 4 and 6). The PA-3 crossing of the White Pigeon River would be on new alignment resulting in impacts to a portion of the floodplain forest that is relatively undisturbed. The impacts of PA-3 on the habitat and functions of the White Pigeon River floodplain forest complexes would be greater than those connected with PA-1 and PA-2. PA-3 bisects the high quality floodplain forest along the St. Joseph River at the same location as PA-1 and PA-2 (wetland 8), resulting in the same loss of wetland functions and values.

PA-3 would impact the moderate quality wetlands 2, 18, 21, 27, 28, 29, 30, and 31. Functions fulfilled by the forested wetlands (wetlands 2, 18, 21, 27, 28, 29, and 31) include provision of wildlife habitat, sediment/nutrient filtering, and aesthetic values. Functions fulfilled by an emergent wetland complex (wetland 30) include provision of sediment/nutrient filtering and shoreline protection.

The low quality wetlands impacted by PA-3 are primarily ditches or depressional areas (wetlands 1, 19, 20, 25, and 26). The primary function fulfilled by these wetlands is floodwater conveyance with minimal stormwater storage.

PA-3 has greater total impacts to wetlands and greater impacts to high quality wetland complexes than do PA-1, PA-2, PA-5, and PA-5 MOD, but fewer impacts than PA-4.

Impacts of PA-4: PA-4 would potentially impact a total of 57.87 acres of wetland located within 19 wetland complexes. Six wetland complexes would be partially impacted, eight bisected, and five would be removed by this alternative.

PA-4 impacts 10.5 acres of high quality wetland located in three complexes (wetlands 4, 6, and 9). The high quality wetlands impacted by PA-4 have similar functions as those discussed for PA-3 since these wetlands are also floodplain forest. Functions being performed include floodwater conveyance and storage capacity, groundwater recharge/discharge, sediment/nutrient filtering, and provision of aesthetic value and habitat for fish and wildlife. These high quality wetlands have potential habitat for listed threatened and endangered species. **Section 4.20, Threatened and Endangered Species Impacts** discusses impacts to these and other potential habitats in greater detail. PA-4 crosses the White Pigeon River at the same location as PA-3 and would have the same impact on the floodplain forest complexes on both sides of the river. PA-4 also bisects a floodplain forest wetland along the St. Joseph River at a location further west than the crossing of the other Build Alternatives. The wetland at the PA-4 crossing has a particularly high quality plant community and is of substantial importance to the watershed. All major wetland functions would be reduced at this crossing by PA-4.

PA-4 would impact the moderate quality wetlands 2, 15, 16, 18, 21, 24, 27, 28, 29, 30, and 31. Functions fulfilled by the forested wetlands (wetlands 2, 18, 21, 24, 27, 28, 29, and 31) include provision of wildlife habitat, sediment/nutrient filtering, and aesthetic values. Functions fulfilled by emergent and depressional wetlands (wetland 15, 16, and 30) include provision of wildlife habitat, sediment/nutrient filtering, and shoreline protection (wetland 30).

The low quality wetlands impacted by PA-3 are primarily ditches or depressional areas (wetlands 1, 10, 25, and 26). Primary functions fulfilled by these wetlands include provision of floodwater conveyance and sediment/nutrient filtering. Wetland 20, another low quality wetland, is a forested wetland providing wildlife habitat.

PA-4 impacts all of a 33.99 acre moderate quality forested wetland with emergent components located south of M-60 and west of existing US-131 (wetland 21). This one wetland accounts for more than half of the total wetland impacts of PA-4, and the impacts would result in the loss of all major wetland functions at this location. Most of the other moderate or low quality wetland impacts connected with PA-4 involve small impacts on the edges of wetland complexes.

PA-4 impacts the largest number of wetland complexes, the greatest wetland acreage, and the most high quality wetland acreage of any of the Build Alternatives.

Impacts of PA-5: PA-5 would potentially impact a total of 0.51 acre of wetland associated with two wetland complexes. One wetland would be partially impacted and one wetland complex would be bisected by this alternative. PA-5 would utilize the existing river crossing at the White Pigeon River (see **Figure 2.3 (sheets 1 and 2)**).

PA-5 impacts one-half acre of high quality wetland located in one complex (wetland 8). This high quality wetland is floodplain forest and performs many functions such as floodwater conveyance and storage capacity, groundwater recharge/discharge, sediment/nutrient filtering, and the provision of aesthetic value and fish and wildlife habitat. This high quality wetland also has potential habitat for listed threatened and endangered species. **Section 4.20, Threatened and Endangered Species Impacts** discusses impacts to these and other potential habitats in greater detail; no endangered species were observed for any alternative, but there were sightings of a limited number of state threatened and special concern species. The high quality wetland that would be impacted by PA-5 is located along the St. Joseph River within a relatively undisturbed floodplain forest of importance to the watershed. PA-5 bisects this wetland as a part of a new floodplain crossing and would result in some loss of all of the functions discussed above.

The low quality wetlands impacted by PA-5 are emergent wetland (wetland 7). The primary function fulfilled by this wetland is filtering of sediment and nutrients.

Because Build Alternatives PA-5 and PA-5 MOD utilize the existing US-131 corridor for most of their alignments, only the by-pass portions of the alignment would require road construction. These Build Alternatives therefore have the least amount of wetland impacts.

Impacts of PA-5 MOD: PA-5 MOD would potentially impact a total of 0.51 acre of wetland associated with two wetlands. One wetland would be partially impacted and one wetland complex would be bisected by this alternative. These wetland impacts are the same as those for PA-5.

Mitigation: MDOT's wetland mitigation efforts include the avoidance and minimization of wetland impacts. In the development of alternatives, wetland impacts were analyzed and alternatives were refined to avoid or minimize wetland impacts where possible. Once the Recommended Alternative is selected, efforts to further minimize wetland impacts would be a part of the highway design process. Design-level impact minimization efforts may include steepening roadside slopes, minor alignment shifts, and interchange reconfigurations where operations would not be adversely affected.

Where wetland impacts cannot be avoided, MDOT would restore previously existing wetlands or create new wetlands in accordance with Part 303, Wetland Protection, of the Natural Resources and Environmental Protection Act of 1994. Mitigation for wetland complexes impacted during the construction of any Build Alternative would include the replacement of wetland functions, benefits, values, and uses. Constructed wetlands would be designed to replicate existing wetland types, hydrological functions, and wildlife habitat values of the impacted wetlands. If possible, mitigation would be provided in close proximity to the proposed wetland impacts.

Mitigation ratios of 2:1 for floodplain forest and forested wetlands, and 1.5:1 for emergent, scrub-shrub, and open water wetlands are proposed. The Build Alternatives are forecasted to impact between 0.51 and 57.87 acres of wetland. **Table 4.14** shows the mitigation acreage required for each of the alternatives.

Five potential compensatory mitigation sites representing 706 acres of potential mitigation have been identified in the vicinity of the study area. The locations of these sites are illustrated in **Figure 4.8 in Section 4.30.4, Wetland Mitigation**. Landowners have been contacted regarding their initial interest, and follow-up contacts have been made or attempted with owners of the more promising sites. Some sites were field-visited in August of 2001 in a coordination meeting with the MDNR and MDEQ. Additional sites were identified following that meeting and a further coordination meeting and site tour was held on May 23, 2002. This meeting was attended by representatives of the MDEQ, USFWS, and the USEPA. Test groundwater monitoring wells would be installed on the potential wetland mitigation sites deemed of highest quality in order to assess the hydrology and potential for wetland mitigation. This would occur with property owner concurrence prior to property acquisition and the completion of final design for the Recommended Alternative. Once a potential mitigation site is chosen, complete studies will be conducted to determine if suitable hydrology exists, the extent of hydric soils, the appropriate plantings, and the potential for environmental impacts (under National Environmental Policy Act guidelines).

Table 4.14 Acres of New Wetland Creation Required

Alternative	Impacts to Floodplain Forest and Forested Wetlands	Proposed Mitigation Acreage Required	Impacts to Emergent, Scrub Shrub, or Unconsolidated Bottom Wetlands	Proposed Mitigation Acreage Required	Total Proposed Mitigation Acreage Required
No-Build	0	0	0	0	0
PA-1	15.58	31.16	0.66	0.99	32.15
PA-2	19.92	39.84	2.51	3.77	43.61
PA-3	22.47	44.94	0.49	0.74	45.68
PA-4	53.65	107.30	4.22	6.33	113.63
PA-5	0.50	1.00	0.01	0.02	1.02
PA-5 MOD	0.50	1.00	0.01	0.02	1.02

Any wetland mitigation that may be required would provide flood and storm water storage, nutrient and sediment retention, and wildlife habitat for small mammals, songbirds, waterfowl, amphibians, and reptiles. Mitigation would be developed to support diverse plant communities representative of the major types of impacted wetland. They would provide habitat for wildlife and provide filtration of nutrient and sediment runoffs to the area. Wetland mitigation sites located within floodplains adjacent to rivers might also provide functions related to the recharge/discharge of groundwater. The mitigated wetlands would also provide aesthetic beauty to the area. Other functions, benefits, values, and uses deemed appropriate and feasible would also be incorporated into the mitigation design.

4.13 Aquatic Impacts

Efforts have been made in the conceptual design of surface water crossings to minimize their effects on aquatic resources, and mitigation of impacts will use MDOT Best Management Practices. These combined efforts will ensure that there are no significant impacts on aquatic resources under any Practical Alternative.

Impacts to the White Pigeon, St. Joseph, and Rocky Rivers may result from new or modified roadway crossings/bridges. Other potential impacts include additional stormwater runoff as a result of new or expanded roadway pavement. Roadway improvements can also contribute sediment and other pollutants to rivers during significant wet weather events. Construction activity within the river channel may result in temporary impacts to surface water quality and aquatic habitat. This includes sedimentation from riverbank disturbance resulting from construction and the removal of adjacent vegetation. These may result in temporary loss of intolerant aquatic species, as well as deposition and erosion along the waterway.

4.13.1 Direct Impacts to Surface Water Quality

Impacts of a No-Build Alternative: There would be no direct impacts to surface water quality from the selection of the No-Build Alternative as few additional runoff impacts would result. Traffic is expected to increase under the No-Build Alternative, but appreciable impacts to surface water quality are not expected.

Impacts of Build Alternatives: Increased pollutant loading associated with roadway traffic is expected under all of the Build Alternatives. Stormwater runoff from roadways can contribute heavy metal contaminants, oils, and deicing chemicals. Runoff impacts related to deicing chemicals, such as chlorides, can often be gauged in relation to the assimilative capacity of the receiving water body. Assimilative capacity is proportional to water volume and flow velocity. Any impacts would be temporary and would depend upon the length of the storm event and the number of storms during the winter season.

The design of the three river crossings would be determined during the design phase of the study. It is anticipated that the bridges over the White Pigeon and St. Joseph Rivers would need to contain at least one waterway pier. Under PA-5 and PA-5 MOD a new bridge would only be required over the St. Joseph River and it would be only one structure, since both of these alternatives are two-lane arterials. Each of the freeway Build Alternatives would span the Rocky River at the current crossing location. Runoff from bridges would be routed overland to vegetated swales or detention ponds prior to it being discharged to minimize instantaneous loading impacts to waterways.

Direct impacts include temporary and minor increases in turbidity and short-term increases in sediment load due to construction activities. The construction activities that would be of concern include re-grading or new grading of roadways, and replacement of existing structures. Appropriate soil erosion and sedimentation control would be required as discussed in **Section 4.30.7, Soil Erosion and Sedimentation Control Mitigation**. If properly mitigated, these impacts would be temporary in nature.

4.13.2 Impacts to Fisheries and Aquatic Habitat

Information related to aquatic habitat and species was obtained from the Michigan Department of Natural Resources (MDNR). A site reconnaissance was also conducted April 22, 2002 to assess habitat quality at the specific river crossings. Detailed information related to these resources is discussed in **Section 3.13.2, Fisheries and Aquatic Habitat**. Related information is contained in **Sections 4.12, Wetland Impacts; 4.14, Hydrological Impacts; 4.19, Wildlife and Vegetation Impacts; and 4.20, Threatened and Endangered Species Impacts**.

Impacts of a No-Build Alternative: The No-Build Alternative is not anticipated to create any impacts on fisheries habitat.

Impacts of Build Alternatives: All freeway Build Alternatives would require crossing the White Pigeon, St. Joseph, and Rocky Rivers, and would result in an increase in the number of structures over the rivers. At the Rocky River, PA-1, PA-2, PA-3, and PA-4 would include a three-lane service drive bridging the river to the east of the mainline US-131 roadway bridges. PA-5 and PA-5 MOD would only require one new two-lane structure at the St. Joseph River. The primary impacts from river crossings on aquatic habitat would come from potential siltation, erosion, increased turbidity from riverbed disturbance during construction, and highway runoff. These water quality issues have the potential to impact fish and aquatic species. Macroinvertebrates would be impacted by increases in sedimentation during construction which could also impact feeding and respiration. If extreme, increased sedimentation could result in the loss of individuals. Once construction is complete, these populations should return to pre-construction levels. It is anticipated that any fish species would re-locate to outside of the area during construction. Once construction is complete, these species would return.

After construction, contaminants within highway runoff may result in the loss of individual macroinvertebrates of more sensitive species. Fish species are not expected to be impacted.

4.13.3 Mitigation of Aquatic Impacts

Adequate soil erosion and sedimentation control measures based on MDOT's approved soil erosion program would be implemented for the Recommended Alternative. Where possible, vegetation buffer strips approximately ten feet in width would be left in place along both sides of all stream crossings on new alignment. Highway runoff would be diverted through grassed waterways or other vegetative controls into containment areas prior to outletting into the streams, where possible. This would promote infiltration, thereby reducing the potential impact on the streams from added runoff and associated pollutants, including deicing salts, heavy metals, and herbicides. Refer to **Section 4.30.7, Soil Erosion and Sedimentation Control Mitigation** for further discussion.

4.14 Hydrological Impacts

Efforts have been made in the conceptual design of surface water crossings to minimize their effects on floodplains. Impacts will be mitigated through compensatory mitigation. To ensure there are no obstructions to flood flow that would result in upstream impacts, a hydraulic study to address structure sizes and waterway openings will be performed at new or modified crossings once a Recommended Alternative is selected. Other surface waters not discussed in **Section 4.13, Aquatic Impacts** have been fully avoided. These combined efforts will ensure that there are no significant impacts on hydrological resources under any Practical Alternative.

4.14.1 Floodplain Impacts

Potential floodplain encroachments were identified by examining Flood Insurance Rate Maps (FIRMS) published by the Federal Emergency Management Agency. There are three rivers located within the study area that have an associated floodplain and would be crossed by the Practical Alternatives. These include the White Pigeon River, the St. Joseph River, and the Rocky River. The limits of the floodplains for each crossing, as shown on **Figure 4.10 (sheets 1-4)**, were estimated from the FIRM maps. The regulatory agency responsible for any construction activities in the floodplain is the Michigan Department of Environmental Quality (MDEQ) in cooperation with the Army Corps of Engineers through an interagency agreement.

The proposed bridge section, which was used to compare the Practical Alternatives at each river crossing, consists of an opening that spans the existing stream channel plus 6 feet minimum on either side of the channel to provide a wildlife corridor on the river banks. After the Recommended Alternative has been identified, a hydraulic analysis would be performed to evaluate each proposed crossing, and if necessary, increase the waterway opening so that there would not be an increase in the elevation of the 100 year flood stage. The Michigan Department of Environmental Quality requires that the proposed structure not cause a harmful interference for any properties within its hydraulic influence. Therefore, for all of the Practical Alternatives, there are no anticipated impacts due to increased flood stage elevations to any properties. This will be verified through the hydraulic analysis for the Recommended Alternative. Although the river crossings as proposed would not impact the flood stages of the river, they would impact wetlands within the floodplains and would require fill within the 100 year floodplain. Floodplain fill impacts are discussed below, while wetland impacts are described in **Section 4.12, Wetland Impacts**.

Mitigation for fill in the floodplain would consist of compensatory storage in the area of impact. Compensatory storage is a volume of storage within or adjacent to a regulatory floodplain used to balance the loss of natural flood storage capacity within the floodplain. All floodplain

encroachments are transverse (perpendicular to the stream). Longitudinal encroachments (parallel to the stream) have been avoided.

Table 4.15 shows the preliminary estimates of compensatory storage requirements for each Practical Alternative. It is anticipated that during final design, further refinement of embankment side slopes would result in minimizing fill in the floodplain. **Table 4.15** also includes a preliminary estimate of the cost of spanning the entire floodplain versus spanning the channel and wildlife corridors. As can be seen, there is a substantial increase in cost to span the entire 100 year floodplain. The costs for spanning the river channels and wildlife corridors include costs for mitigation of wetland impacts and for provision of compensatory storage.

Impacts of a No-Build Alternative: The No-Build Alternative would not introduce new crossings of the floodplains within the study area.

Impacts of Build Alternatives: PA-1 through PA-4 would require crossing over floodplains associated with the White Pigeon, St. Joseph, and Rocky Rivers. PA-5 and PA-5 MOD would require only one new river crossing, a two-lane bridge over the St. Joseph River. All Build Alternatives would result in structures with a greater flow area for flood conveyance than the existing structures associated with the No-Build Alternative. The details of the proposed crossings and floodplain widths for the Build Alternatives are presented in **Table 4.16**.

At the White Pigeon River, new structures for PA-1 and PA-2 would have the narrowest floodplain to cross while PA-3 and PA-4 would cross a wider floodplain of approximately 1,085 feet. The length of the existing US-131 structure at this location is 112', while the associated floodplain width at the existing crossing of the White Pigeon River is 370'; upstream and downstream of existing US-131 the floodplain width is near 1,000'. When existing US-131 was constructed, the floodplain for the bridge approaches was filled to reduce the necessary span over the White Pigeon River, resulting in a much narrower floodplain at the existing crossing. PA-1 would utilize the footprint of the existing crossing while necessitating a new bridge. Due to the increased width of the alternative, fill in the floodplain is necessary. PA-5 and PA-5 MOD would utilize the existing crossing and result in no additional fill in the floodplain. PA-2 would remove the existing US-131 structure and require the construction of three new structures to accommodate the northbound and southbound lanes and a proposed service drive to the east. PA-3 and PA-4 would provide a new crossing of the White Pigeon River approximately 2,600 feet west (downstream) of the existing US-131 crossing, which would remain. PA-2, PA-3 and PA-4 would result in more than 300 cubic yards of fill in the White Pigeon River floodplain, and therefore compensatory storage would be required.

All Build Alternatives would cross the St. Joseph River at a new location. PA-1, PA-2, PA-3, PA-5, and PA-5 MOD would cross at the same location, approximately 4,500 feet west (downstream) of the existing US-131 crossing, which would remain. The proposed structures are outside the area of hydraulic influence of the existing US-131 structure. PA-4 would cross approximately 8,500 feet west (downstream) of the existing US-131 crossing, which would remain. All Build Alternatives would result in more than 300 cubic yards of fill in the St. Joseph River floodplain, and therefore compensatory storage would be required. PA-5 and PA-5 MOD would be two-lane facilities and would require one bridge structure. All freeway Build Alternatives would require four lanes over the St. Joseph River.

Table 4.15 Spanning Floodplain - versus - Spanning Channel

PA-1	Spanning Floodplain			Spanning Channel				
River	Span Length	100 Yr. Flood Elevation	Cost	Span Length	Channel Width	Bridge Cost	Total Fill Cost	Fill in Floodplain (cu. Yds.)
White Pigeon	397'	801'	\$4,144,680	135' ³	105'	\$1,409,400	\$10,860	3,339
St. Joseph	855'	781'	\$9,644,400	405'	375'	\$4,568,400	\$61,030	18,777
Rocky River	433'	812'	\$7,530,240	110' ¹	80'	\$2,450,400	\$12,910	3,971
	Cost \$21,319,320			Cost ² \$8,821,700				
PA-2	Spanning Floodplain			Spanning Channel				
River	Span Length	100 Yr. Flood Elevation	Cost	Span Length	Channel Width	Bridge Cost	Total Fill Cost	Fill in Floodplain (cu. Yds.)
White Pigeon	467'	801	\$8,125,800	210'	180'	\$3,654,000	\$33,370	10,266
St. Joseph	855'	781	\$9,644,400	405'	375'	\$4,568,400	\$61,030	18,777
Rocky River	433'	812'	\$7,530,240	110' ¹	80'	\$2,450,400	\$12,910	3,971
	Cost \$25,300,440			Cost ² \$11,198,500				
PA-3	Spanning Floodplain			Spanning Channel				
River	Span Length	100 Yr. Flood Elevation	Cost	Span Length	Channel Width	Bridge Cost	Total Fill Cost	Fill in Floodplain (cu. Yds.)
White Pigeon	1098'	794	\$15,547,680	160'	130'	\$2,265,600	\$46,430	14,285
St. Joseph	855'	781	\$9,644,400	405'	375'	\$4,568,400	\$61,030	18,777
Rocky River	433'	812'	\$7,530,240	110' ¹	80'	\$2,450,400	\$12,910	3,971
	Cost \$32,722,320			Cost ² \$9,956,800				
PA-4	Spanning Floodplain			Spanning Channel				
River	Span Length	100 Yr. Flood Elevation	Cost	Span Length	Channel Width	Bridge Cost	Total Fill Cost	Fill in Floodplain (cu. Yds.)
White Pigeon	1098'	794	\$15,547,680	160'	130'	\$2,265,600	\$46,430	14,285
St. Joseph	1,370'	781	\$15,453,600	310'	280'	\$3,496,800	\$143,750	44,230
Rocky River	433'	812'	\$7,530,240	110' ¹	80'	\$2,450,400	\$12,910	3,971
	Cost \$38,531,520			Cost ² \$9,037,200				
PA-5	Spanning Floodplain			Spanning Channel				
River	Span Length	100 Yr. Flood Elevation	Cost	Span Length	Channel Width	Bridge Cost	Total Fill Cost	Fill in Floodplain (cu. Yds.)
White Pigeon	N/A ³	N/A ³	\$0	N/A ³	N/A ³	\$0	\$0	0
St. Joseph	855'	781	\$4,822,200	405'	375'	\$2,284,200	\$35,830	11,022
Rocky River	N/A ³	N/A ³	\$0	N/A ³	N/A ³	\$0	\$0	0
	Cost \$ 4,822,200			Cost ² \$2,331,052				
PA-5 MOD	Spanning Floodplain			Spanning Channel				
River	Span Length	100 Yr. Flood Elevation	Cost	Span Length	Channel Width	Bridge Cost	Total Fill Cost	Fill in Floodplain (cu. Yds.)
White Pigeon	N/A ³	N/A ³	\$0	N/A ³	N/A ³	\$0	\$0	0
St. Joseph	855'	781	\$4,822,200	405'	375'	\$2,284,200	\$35,830	11,022
Rocky River	N/A ³	N/A ³	\$0	N/A ³	N/A ³	\$0	\$0	0
	Cost \$4,822,200			Cost ² \$2,346,900				
¹ Service drive not shown. ² Costs include wetland mitigation and compensatory floodplain storage. ³ Existing structure to be utilized.								
Costs are in 2004 dollars								

Table 4.16 Estimated Dimensions of Structures

River Crossing	PA-1	PA-2	PA-3	PA-4	PA-5	PA-5 MOD
White Pigeon River						
100 Year Floodplain Width*	370'	440'	1,085'	1,085'	370'	370'
Channel Width*	105'	180'	130'	130'	105'	105'
Existing Structure	112' span, same alignment	112' span, same alignment	112' span, 2,600' upstream	112' span, 2,600' upstream	112' span, same alignment	112' span, same alignment
Proposed Span Length**	135'	210'	160'	160'	N/A	N/A
Proposed Total Bridge Deck(s) Width (ft.)	87'	94' + 51' for service drives	118'	118'	N/A	N/A
St. Joseph River						
100 Year Floodplain Width*	810'	810'	810'	1,325'	810'	810'
Channel Width*	375'	375'	375'	280'	375'	375'
Existing Structure	250' span, 4,500' upstream	250' span, 4,500' upstream	250' span, 4,500' upstream	250' span, 8,500' upstream	250' span, 4,500' upstream	250' span, 4,500' upstream
Proposed Span Length**	405'	405'	405'	310'	405'	405'
Proposed Total Bridge Deck(s) Width (ft.)	94'	94'	94'	94'	47'	47'
Rocky River						
100 Year Floodplain Width*	420'	420'	420'	420'	420'	420'
Channel Width*	80'	80'	80'	80'	80'	80'
Existing Structure	90' span, same alignment	90' span, same alignment	90' span, same alignment	90' span, same alignment	90' span, same alignment	90' span, same alignment
Proposed Span Length**	110'	110'	110'	110'	N/A	N/A
Proposed Total Bridge Deck(s) Width (ft.)	94' + 63' for service drives	94' + 63' for service drives	94' + 63' for service drives	94' + 63' for service drives	N/A	N/A
*Approximate measurement parallel to alignment. **Preliminary estimate, final length will be determined following hydraulic analysis of the recommended alternative.						

All Build Alternatives cross the Rocky River at the same location as existing US-131. The existing US-131 structure would be removed, and a new bridge constructed to carry the northbound and southbound lanes of PA-1, PA-2, PA-3, and PA-4 over the river and Hoffman Road. Due to the elevation necessary for the bridge over Hoffman Road, the new US-131 structures would span the entire floodplain of the Rocky River, and not cause any fill to be placed in its floodplain. In addition, a new crossing of the Rocky River would be required for the proposed service drive approximately 200 feet to the east of the proposed northbound lanes for PA-1, PA-2, PA-3, and PA-4. The service drive crossing would result in more than 300 cubic yards of fill in the Rocky River floodplain, and therefore compensatory storage would be required. PA-5 and PA-5 MOD would utilize the existing bridge over the Rocky River.

To ensure that all environmental and hydraulic impacts associated with the floodplain crossings of the Recommended Alternative are minimized, further evaluation of crossing options would be conducted. This would include an examination of spans and approaches, median widths, side slopes, and costs. A hydraulic design study that addresses various structure size alternatives would be performed for the new or modified crossings of the Recommended Alternative. The analysis would consider existing and proposed conditions and the results would determine the necessary and proper bridge types, openings, and locations of abutments and piers to minimize impacts. All bridge spans crossing floodplains are proposed to exceed the length of the existing US-131 spans over the affected rivers. Openings for new structures would be sized in conjunction with the hydraulic analysis so as not to cause an adverse increase in backwater.

Wildlife corridors would be maintained on the riverbanks to allow for wildlife movement along the river.

4.14.2 Other Stream Crossings

No other stream crossings are anticipated for any of the Practical Alternatives.

4.14.3 Mitigation of Floodplain and Stream Crossing Impacts

Compensatory floodplain storage is proposed for any fill within the 100 year floodplain. A summary of MDOT's standard procedures for mitigation is located in **Section 4.30.6, Floodplain, Stream, and Drain Crossing Mitigation.**

4.15 Wild and Scenic River Impacts

None of the Practical Alternatives cross Federal Wild or Scenic River systems and there are no state designated Natural Rivers, as defined in the Natural Rivers Act (Act 231 of 1970), within the study area.

4.16 Coastal Barrier Impacts

There are no federally designated coastal barriers, as defined in the Coastal Barriers Act of 1982 (P.L. 97-348), within the study area.

4.17 Coastal Zone Impacts

The study area is not located within a federal coastal zone management boundary, as defined by the Coastal Zone Management Act of 1972.

4.18 Geological Resources Impacts

No unusual and/or problem geographic, geologic, geophysical, or topographic features have been identified within the study area. No impacts to any geological resource are anticipated as a result of any of the alternatives considered for this project.

4.19 Wildlife and Vegetation Impacts

Little of the study area offers habitat for wildlife, and potential impacts on those areas that do will be minimized to the greatest degree possible, with mitigation proposed for sensitive wetlands. The Fabius State Game Area has been fully avoided by the project. Mature stands of trees will be avoided to the greatest degree possible, and landscaping of the ROW will attempt to replace the functions of existing affected vegetation. For these reasons, the Practical Alternatives will not have a substantial long term effect on wildlife habitat and vegetation. PA-5 and PA-5 MOD will have minimal effect.

Most of the upland areas within the study area have been converted to agriculture. The remaining natural areas are primarily woodlands with scattered marshes and bogs. Small woodlands are found throughout the project area, often as small lots set aside from farming. The largest forests are found adjacent to the White Pigeon, St. Joseph, and Rocky Rivers. A complete description of the plants and animals found in the project area can be found in **Section 3.19, Wildlife and Vegetation**. **Section 4.20, Threatened and Endangered Species Impacts** discusses impacts specific to protected species. **Section 4.12, Wetland Impacts** discusses impacts specific to wetland habitat. This section discusses impacts from the project to non-protected species and habitats other than wetlands. In the project study area, this habitat is primarily woodlands.

To evaluate opportunities for minimizing impacts to the White Pigeon River and its ecosystem, the western limit of the study area was expanded to provide access to narrower portions of the floodplain. However, due to the presence of the Stag Lake Bog, and design criteria for avoiding the bog and the Rivercrest subdivision on the north side of the river, it was determined that this was not a practical location for crossing the river. For those Practical Alternatives that require constructing a new bridge, the next narrowest site is the transverse crossing used by PA-3 and PA-4. PA-5 and PA-5 MOD would not require any new structure crossing the White Pigeon River.

4.19.1 Impacts to Habitat and Vegetation

Impacts of a No-Build Alternative: There are no direct impacts to wildlife and vegetation from the No-Build Alternative.

Impacts of Build Alternatives: Wildlife would be displaced due to impacted habitat described in **Table 4.17**, although there is suitable habitat within the study area for displaced wildlife. Bisecting woodlands, results in additional impacts to vegetative structure and wildlife habitat due to the resulting edge effects. The acreage of woodland habitat impacts shown in **Table 4.17** do not match the acres of upland forest listed for each Practical Alternative in **Table 4.1** in **Section 4.1, Land Use Impacts** since some of the woodland impacts occur on properties that are also classified as wetlands, agricultural, or residential.

Table 4.17 Acres of Woodland Habitat Impact

	No-Build	PA-1	PA-2	PA-3	PA-4	PA-5/PA-5 (MOD)
Low Quality	0	60.14	47.41	44.03	5.26	2.29
Moderate Quality	0	38.22	40.15	63.15	57.54	1.30
High Quality**	0	4.08	18.94	11.35	19.25	0
Upland Prairie*	0	0	0	0	4.83	0
Total Habitat	0	102.44	106.50	118.53	86.88	3.59
Bisected Woodlands***	0	56.90	16.98	60.19	40.41	3.59
Fabius State Game Area Impacts	0	0	0	0	0	0
* Low-quality successional prairie ** All high quality floodplain forest *** Included in above total habitat figure						

The comparison of the impacts of the Practical Alternatives on wildlife and vegetation is complex. For example, an assessment based on total acreage shows that PA-3 has the most impacts, with PA-5 and PA-5 MOD having the least. However, PA-2 and PA-3 impact greater quantities of high quality habitat.

4.19.2 Impacts to Designated Natural Areas

As noted in **Section 3.19.2, Natural Areas**, the one mile wide study corridor abuts the Fabius State Game Area. Two other game areas are located several miles from the corridor. No State Parks, privately owned nature preserves, or federally owned forests are located within the vicinity of the study corridor. As a part of the refinement of alternatives, alignments were modified to avoid natural resources and minimize impacts on these areas as much as possible.

The Fabius State Game Area is a 119-acre brushland and forested area managed by the MDNR, located on the east side of US-131 approximately one-quarter mile north of Drummond Road, in Fabius Township. The facility is used primarily for hunting.

Impacts of a No-Build Alternative: The No-Build Alternative would not impact the Fabius State Game Area.

Impacts of Build Alternatives: None of the Build Alternatives would encroach further than the current US-131 alignment upon the Fabius State Game Area. The northbound lanes of PA-2, PA-5 and PA-5 MOD would be located on approximately the same alignment as existing US-131, resulting in no impact. PA-1, PA-3, and PA-4 would realign US-131 to the west, further from the Fabius State Game Area.

4.19.3 Mitigation of Wildlife and Vegetation Impacts

Although some tree removal would be necessary, the existing natural and ornamental vegetative cover would be retained wherever possible within the proposed ROW. Impacts to terrestrial habitats would be minimized during final design through refinements that reduce cross-section widths and maintain existing hydrological conditions, and through construction techniques that minimize mature tree removal.

4.20 Threatened and Endangered Species Impacts

No state or federal listed threatened, endangered, or special concern plant species were observed in the potential ROW of any Build Alternative. The Practical Alternatives will not have a substantial impact on listed plant or animal species. Three state special concern animal species were observed within the study area. No federally listed species or state threatened or endangered animal species were observed. Mitigation will be necessary to minimize impacts on listed animal species to ensure that the project does not create a significant impact on these species. To mitigate the effects of US-131 improvements on threatened, endangered, and special concern species, the Practical Alternatives underwent an iterative process of refinement to a) avoid resources altogether, particularly high-value habitat, then b) minimize impacts where resources could not be fully avoided. Mitigation efforts will include staging construction to avoid sensitive species' breeding/spawning periods and use of best management practices to minimize habitat deterioration.

An investigation for federal and state listed threatened, endangered, or state special concern species was conducted within the study area during three periods: May 22-26 and August 14-18, 2000, and June 4-7, 2001. Site investigations were conducted utilizing the MDNR, Endangered Species Program, Wildlife Division's *Guidelines for Conducting Endangered and Threatened Species Surveys* (May 2001). Five state endangered or state animal species of special concern were observed in the project corridor. Three of these species would be impacted by one or more of the Build Alternatives. All are state species of special concern. The investigation did not identify any direct impacts to federal threatened, federal endangered, or state endangered plant species.

Figure 4.10 (sheets 1-4) at the end of this section shows the locations of sites that were identified as having potential habitat for listed species or otherwise identified as sensitive communities. A sensitive community is defined as habitat that has characteristics that indicate the potential to support multiple threatened or endangered species. **Tables 3.9 and 3.10** in **Section 3.20, Threatened and Endangered Species**, summarize the species habitat by site.

4.20.1 Listed Plant Species

Five listed plant species have potential habitat in the study area (**Table 3.8**). The threatened and endangered species investigation identified the presence of only three of the five plant species, tall beak rush (*Rynchospora macrostachya*), wild rice (*Zizania aquatica*), and hairy-fruited sedge (*Carex trichocarpa*) within the study area. However, these species were located outside any of the Build Alternatives' right-of-way (ROW).

Impacts of a No-Build Alternative: The No-Build Alternative would have no direct impact on threatened, endangered, or special concern plant species. Plant species which may be occurring in the vicinity of the existing alignment have adjusted to accommodate the roadway.

Species which may be sensitive to contaminants found in stormwater runoff from the roadway would likely not be found in the vicinity.

Impacts of Build Alternatives: No listed plant species were observed within the proposed ROW of any Build Alternative. Efforts have been made to refine alternative alignments to avoid impacting areas that have listed species. **Table 4.18** identifies the sites where listed plant species were observed.

Portions of Site 9, as depicted in **Figure 4.10 (sheets 1-4)**, would be affected under Practical Build Alternatives PA-1, PA-2, PA-3, and PA-4. Portions of Site 12 would be affected under all of the Practical Build Alternatives.

Site 9 offers habitat for tall beak rush and cut-leaved water parsnip. However, neither tall beak rush nor cut-leaved water parsnip were identified at Site 9 during the field investigations. Tall beak rush was identified at Site 8, but Site 8 is outside the ROW for all of the Build Alternatives. None of the Practical Build Alternative would impact these species.

Table 4.18 Observed or Potential Habitat for Threatened, Endangered, and Special Concern Plant Species

Species	Status*	Site of Impact	Impacted By Alternative						
			No-Build	PA-1	PA-2	PA-3	PA-4	PA-5	PA-5 MOD
Tall Beak Rush	SSC	Site 9	-	X	X	X	X	-	-
Bog Bluegrass	ST	No Impact	-	-	-	-	-	-	-
Cut-Leaved Water Parsnip	ST	No Impact	-	-	-	-	-	-	-
Wild Rice**	ST	Site 12	-	X**	X**	X**	X ^{xx}	X ^{xx}	X ^{xx}
Hairy-Fruited Sedge	SSC	No Impact	-	-	-	-	-	-	-
x = Potential habitat for species at site; species not observed X = Species actually observed at site *SSC = State Special Concern; ST = State Threatened **There is low probability that wild rice would be affected, because the species was not observed in the vicinity of the proposed areas of impact (Site 12).									

Wild rice was identified in the study area at Site 12 but it was not observed in the immediate vicinity of the proposed ROW. None of the Practical Build Alternatives would impact this species.

Practical Build Alternative PA-4 is proposed to cross the St. Joseph River (Site 12) at a location that would impact a high quality forested portion of the floodplain. Wild rice was not observed in the immediate vicinity of the proposed crossing. However, the habitat has a moderate to high likelihood of being suitable for wild rice. If PA-4 is identified as the Recommended Alternative, further study of the area of impact may be warranted to assess if special mitigation would be required.

Other sites that either are known to harbor or have the potential for harboring endangered or threatened plant species, specifically the bog and fen habitat of Sites 8, 25, and 36, would not be affected by any Build Alternatives.

Recommended mitigation measures are provided in the **Section 4.20.3, Mitigation of Threatened and Endangered Species Impacts**.

4.20.2 Listed Animal Species

Fourteen federal or state threatened, endangered, or special concern animal species are listed as having potential habitat in the study area. Five listed species were determined to be present in the project corridor during the threatened and endangered species investigation (**Table 3.10**). Three state listed species of Special Concern, the prothonotary warbler (*Protonotaria citrea*), yellow-throated warbler (*Dendroica dominica*), and eastern box turtle (*Terrapene carolina carolina*) were located within the floodplain of the White Pigeon River in the proximity of the freeway Build Alternatives. No impacts to any federally listed or state listed threatened or endangered species are anticipated for any Practical Alternative.

A qualified biologist surveyed the study area to determine if suitable habitat occurs within the study area, in accordance with a USFWS letter dated July 26, 2001. Potential habitat exists within the study area for six listed animal species which were not identified as being present. Potential habitat for the eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*), copperbelly water snake (*Nerodia erythrogaster neglecta*), and Indiana bat (*Myotis sodalists*) was identified at Site 9. Potential habitat for the river redhorse (*Moxostoma carinatum*), the snuffbox mussel (*Epioblasma triquetra*), and the purple wartyback mussel (*Cyclonaias tuberculata*) was identified at Site 12. During the three field investigations, no observations of any of these species were made within these respective habitats, therefore a biological assessment is not required. There is a reasonable degree of certainty that these habitats have been adequately investigated and the species are not present within the study area. No impacts are anticipated.

Impacts of a No-Build Alternative: The No-Build Alternative would have no direct impact on threatened, endangered, or special concern animal species. Any animals which may be living in the vicinity of the existing alignment have adjusted their territories to accommodate the roadway. There may be occasional losses of individuals from encounters with vehicles during road crossings.

Impacts of Build Alternatives: Efforts have been made to develop and refine alternative alignments to avoid impacting areas harboring listed species. **Table 4.19** identifies sites where listed animal species or potential habitat was observed in proximity to the Practical Alternatives.

Table 4.19 Observed or Potential Habitat for Threatened, Endangered, and Special Concern Animal Species

Species	Status*	Site of Impact	Impacted By Alternative						
			No-Build	PA-1	PA-2	PA-3	PA-4	PA-5	PA-5Mod
Blazing Star Borer	SSC	No Impact	-	-	-	-	-	-	-
Karner Blue Butterfly	FE	No Impact	-	-	-	-	-	-	-
Prothonotary Warbler	SSC	9	-	X	X	X	X	-	-
Yellow-Throated Warbler	SSC	9	-	X	X	X	X	-	-
Eastern Box Turtle	SSC	9	-	X	X	X	X	-	-
Eastern Massasauga	SSC	9	-	x	x	x	x	-	-
Copperbelly Water Snake	SSC; FT	9	-	x	x	x	x	-	-
Indiana Bat	FE	9	-	x	x	x	x	-	-
River Redhorse	ST	12	-	x	x	x	x	x	x
Snuffbox	SE	12	-	x	x	x	x	x	x
Purple Wartyback	SSC	12	-	x	x	x	x	x	x
Blanding's Turtle (observed at Site 20)	SSC	No Impact	-	-	-	-	-	-	-
Loggerhead Shrike (observed at Site 27)	SE	No Impact	-	-	-	-	-	-	-
Lake Herring	ST	No Impact	-	-	-	-	-	-	-

x = Potential habitat for species; species not observed
 X = Species actually observed at site
 *SSC = State Special Concern; ST = State Threatened; SE = State Endangered; FT = Federally Threatened;
 FE = Federally Endangered.

As noted above, portions of Site 12 (refer to **Figure 4.10 (sheets 1-4)** at the end of this section), would be affected under all of the Practical Alternatives. Portions of Site 9 would be affected under Practical Alternatives PA-1, PA-2, PA-3, and PA-4. Prothonotary warbler, yellow-throated warbler, and eastern box turtle species were all observed at Site 9. Eastern massasauga rattlesnake, copperbelly water snake, and Indiana bat were not observed at Site 9, but have potential habitat at this location. At Site 12, river redhorse and the snuffbox and purple wartyback mussels all have potential habitat, though none were observed.

Other sites that either are known to harbor or have potential for harboring endangered or threatened animal species, specifically Sites 2, 7, 20, 27, 33, 36, 37, and 38, would not be affected by any Build Alternative.

At Sites 9 and 12, the impacts and location of impact vary by alternative as described below.

Impacts of PA-1 and PA-2: PA-1 and PA-2 involve widening the current crossing of the White Pigeon River floodplain (Site 9). Widening would impact sedge meadow and wet wooded communities within the floodplain. There would be probable impacts to floodplain habitat, and yellow-throated warbler and prothonotary warbler populations. The eastern box turtle was found within the woods at this site.

PA-1 and PA-2 could impact either of the two warbler species by removing trees currently being used for nesting or roosting. This would in turn result in shifts in territories, which could impact breeding pairs. Permanent shifts in territories would eventually occur, and breeding pairs would again stabilize. There may be occasional losses of individuals from encounters with vehicles during road crossings. During construction, noise could impact breeding or foraging activities of these species. Noise impacts would be short term and temporary.

Impacts to the eastern box turtle include potential alterations of individual territories due to the road placement. If this happened, permanent shifts in territories would eventually occur and stabilize. During construction, noise could impact breeding or foraging activities of these species. Noise impacts would be short term and temporary.

Habitat for the eastern massasauga rattlesnake and the Indiana bat was observed, but no specimens were noted. Loss of trees due to construction of the new roadway could eliminate roosting trees for the Indiana bat. It is expected that if any bats are in the vicinity, they would re-locate to other roosting trees that are available in the area. If any specimens of the eastern massasauga are present they might be impacted by having their territories disrupted. Permanent shifts in territories would eventually occur and populations would stabilize.

Possible mitigation measures for these species are described in **Section 4.20.3, Mitigation of Threatened and Endangered Species Impacts.**

PA-1 and PA-2 involve a new crossing of the St. Joseph River floodplain (Site 12). The proposed crossing may impact potential habitat for the river redhorse and the snuffbox and purple wartyback mussels. No individuals of these species were noted. If present, loss of individual mussels could occur due to placement of bridge abutments. Increases in sedimentation during construction could also impact mussel feeding and respiration. If extreme, increased sedimentation could result in the loss of individuals. No impacts are expected to the river redhorse. It is anticipated that any river redhorse individuals would re-locate to outside of the area during construction. Once construction was complete, this species would return. Possible mitigation measures are described in **Section 4.20.3, Mitigation of Threatened and Endangered Species Impacts.**

Impacts of PA-3 and PA-4: PA-3 and PA-4 propose a new crossing of the White Pigeon River, west of the current crossing. The proposed crossing would impact the forested portion of the floodplain, but would not involve impact to any sedge meadow communities. There would be probable impacts to floodplain habitat, and yellow-throated warbler and prothonotary warbler populations. Forest impacts could result in impacts to the eastern box turtle. Impacts to these three species would be similar to those discussed above under PA-1 and PA-2 impacts. There is also a possibility of impacts to undetected Indiana bat populations and eastern massasauga rattlesnake. Impacts to these two species would be similar to those discussed above under PA-1 and PA-2. Possible mitigation measures are described in **Section 4.20.3, Mitigation of Threatened and Endangered Species Impacts.**

PA-3 involves a new crossing of the St. Joseph River floodplain (Site 12), at the same location as PA-1 and PA-2 and would have the same impacts. PA-4 involves a new crossing of the St. Joseph River floodplain (Site 12) further west than PA-1, PA-2, or PA-3. The proposed crossing may impact potential habitat for the river redhorse and the snuffbox and purple wartyback mussels. Impacts on these species due to this alternative would be the same as those discussed under PA-1 and PA-2. Possible mitigation measures are described in the following text.

Practical Build Alternative PA-4 is proposed to cross the St. Joseph River (Site 12) at a location that would impact a high quality forested portion of the floodplain. Backwaters associated with the St. Joseph River in this location may provide suitable habitat for river redhorse and the snuffbox and purple wartyback mussels. If PA-4 is identified as the Recommended Alternative, further study of the area of impact may be warranted to assess the potential for previously unidentified populations of these species. Impacts on these species due to this alternative would be the same as those discussed under PA-1 and PA-2.

Impacts of PA-5 and PA-5 MOD: PA-5 and PA-5 MOD do not involve widening the current crossing of the White Pigeon River floodplain, nor do they include construction of a new bridge at this location (Site 9). No new impacts to the sedge meadow and wet wooded communities would occur within the floodplain, nor would new impacts to floodplain habitat, and yellow-throated warbler, prothonotary warbler, or eastern box turtle populations occur.

PA-5 and PA-5 MOD involve a new crossing of the St. Joseph River floodplain (Site 12), at the same general location as PA-1, PA-2, and PA-3. Despite the fact that the ROW and area of disturbance would be smaller than in the other alternatives, PA-5 and PA-5 MOD would have similar impacts on potential habitat. The proposed crossing would impact a high quality forested portion of the floodplain. The proposed crossing may impact potential habitat for the river redhorse and the snuffbox and purple wartyback mussels. Impacts on these species due to this alternative would be the same as those discussed under PA-1 and PA-2. Possible mitigation measures are described in the following text.

4.20.3 Mitigation of Threatened and Endangered Species Impacts

To mitigate the effects of US-131 improvements on threatened, endangered, and special concern species, the Practical Alternatives underwent an iterative process of refinement to a) avoid resources altogether, then b) minimize impacts where resources could not be fully avoided. During development, the Practical Alternatives first avoided the larger and higher-valued bog and fen habitats. The higher quality wetland resources were avoided to the extent possible. Unavoidable impacts were then minimized. In addition to measures taken to avoid or minimize impacts, the following standard MDOT mitigation measures are proposed:

- All construction operations would be confined to the highway ROW limits or acquired easements
- Areas disturbed by construction activities would be stabilized and vegetated as soon as possible during the construction period in order to control erosion. Emphasis would be placed on the use of native plant species to the maximum extent possible
- An erosion control plan would be formulated and adhered to during work near the White Pigeon, St. Joseph, and Rocky Rivers to ensure that potential habitat would not be adversely impacted
- Required permits would be obtained from the MDNR and the MDEQ
- Existing natural and ornamental vegetative cover would be retained wherever and whenever possible within the right-of-way limits. Where existing ground cover must be removed, replacement vegetation would be established in a timely manner, using seed and mulch or sod
- Groundwater and surface water quality would be protected

Specific mitigation actions beyond standard mitigation would be considered to protect particular listed wildlife and plant species within locations that are likely to be impacted by the proposed project. These include:

- Avoiding construction activity to the extent possible near Site 9 during the warbler nesting period (generally April to June)
- Avoiding construction activity to the extent possible near Site 9 during the turtle mating season. Eastern box turtles generally mate May to June in woodlands.
- Avoiding construction activities to the extent possible at any St. Joseph River crossing (Site 12) during the river redhorse spawning migration periods (generally late March to early June), and
- Avoiding the removal of mature trees to the extent possible between April 1st and October 1st to minimize potential impacts to habitat of the Indiana Bat

4.21 Cultural Resource Impacts

4.21.1 Historical Resources

This section describes the potential impacts to cultural resources associated with each of the Practical Alternatives. All of the Practical Alternatives have the potential for adverse impacts to historic resources. PA-2 is the only Practical Alternative for which the potential relocation of a historic structure is anticipated. Potential impacts are shown in **Table 4.20** and **Figure 4.2** through **4.7** which follow. These impacts are shown by segment to allow for comparison of the impacts on different areas within the study corridor. These segment locations are depicted on the foldout map in **Appendix E**. There is one site listed on the National Register of Historic Places (NRHP) and six sites eligible for inclusion on the NRHP that were determined to have potential impacts as a result of the proposed project. These sites are listed in **Table 4.20**, and they include:

- Site A - Michigan State Police Post, White Pigeon
- Site B - Wahbememe Memorial Park, White Pigeon
- Site C - 63280 US-131, Constantine
- Site D - 63000 US-131, Constantine
- Site E - 62249 US-131, Constantine
- Site F – 15303 W. Broadway, Three Rivers
- Site G – 59019 US-131, Three Rivers

Impacts range from total relocation of a property or structure, to partial property acquisition for right-of-way (ROW), to construction of a highway facility adjacent to a listed or potentially eligible site.

Table 4.20 Cultural Resources In Close Proximity to Practical Alternatives, by Segment

		Site A	Site B	Site C	Site D	Site E	Site F	Site G	Total Sites
PA-1	Segment A	-	-	-	-	-	-	-	-
	Segment B	-	-	X	-	X	-	-	2
	Segment C	-	-	-	-	-	-	-	-
	Segment D	-	-	-	-	-	-	-	-
	PA-1 Total	-	-	-	-	-	-	-	2
PA-2	Segment A	X	X	-	-	-	-	-	2
	Segment B	-	-	X	-	X	-	-	2
	Segment C	-	-	-	-	-	X	-	1
	Segment D	-	-	-	-	-	-	-	-
	PA-2 Total	-	-	-	-	-	-	-	5
PA-3	Segment A	-	-	-	-	-	-	-	-
	Segment B	-	-	X	-	X	-	-	2
	Segment C	-	-	-	-	-	-	-	-
	Segment D	-	-	-	-	-	-	-	-
	PA-3 Total	-	-	-	-	-	-	-	2
PA-4	Segment A	-	-	-	-	-	-	-	-
	Segment B	-	-	-	-	-	-	-	-
	Segment C	-	-	-	-	-	X	-	1
	Segment D	-	-	-	-	-	-	-	-
	PA-4 Total	-	-	-	-	-	-	-	1
PA-5	Segment A	-	-	-	-	-	-	-	-
	Segment B	-	-	X	-	-	-	-	1
	Segment C	-	-	-	-	-	-	-	-
	Segment D	-	-	-	-	-	-	-	-
	PA-5 Total	-	-	-	-	-	-	-	1
PA-5 MOD	Segment A	-	-	-	-	-	-	-	-
	Segment B	-	-	-	-	-	-	-	-
	Segment C	-	-	-	-	-	-	-	-
	Segment D	-	-	-	-	-	-	-	-
	PA-5 MOD Total	-	-	-	-	-	-	-	-
Segment A- White Pigeon Area: from southern project terminus to Dickinson Road Segment B- Constantine Bypass: from Dickinson Road to Gleason Road Segment C- Three Rivers South: from Gleason Road to Hoffman Road Segment D- Three Rivers North: Hoffman Road to one-mile North of Cowling Road									

The potential impacts associated with the Practical Alternatives for each identified cultural resource site are discussed below. The No-Build Alternative would not result in any cultural resource impacts.

Site A - Michigan State Police Post, White Pigeon

The Michigan State Police post at 101 N. US-131 is located in the northeast quadrant of the intersection of US-131 and US-12. As shown in **Figure 4.2**, PA-2 would have an adverse effect by requiring the relocation of the police post, while PA-1, PA-5 and PA-5 MOD would have no adverse effect. No impacts from PA-3 and 4 are anticipated. Due to the potential significance of the police post and the associated impacts, a 4(f) evaluation has been prepared for this property and is included in **Section 5.0, Section 4(f) Evaluation**.

Site B - Wahbememe Memorial Park, White Pigeon

The Wahbememe Memorial Park is located in a one-acre park in the northwest quadrant of the intersection of US-131 and US-12. The memorial is listed on the NRHP. No impacts from PA-3 and 4 are anticipated. PA-1, PA-5 and PA-5 MOD would not require relocation of the memorial. As shown in **Figure 4.2**, PA-2 would require relocating the entrance to the Wahbememe Memorial Park from its current location on US-131 to a new location on the Memorial's south property line off of US-12. With PA-2, access from existing US-131 would be closed and all four quadrants of the intersection would be acquired for ROW. The memorial would remain, however, access would be provided off of US-12 and the existing parking lot would be turned into grass and a new parking area constructed. PA-1 would have no adverse effect on the property. PA-2 would have no adverse effect as long as comparable or better parking replaced the former parking lot. Due to the significance of the memorial and the potential associated impacts, a 4(f) evaluation has been prepared for this property and is included in **Section 5.0, Section 4(f) Evaluation**.

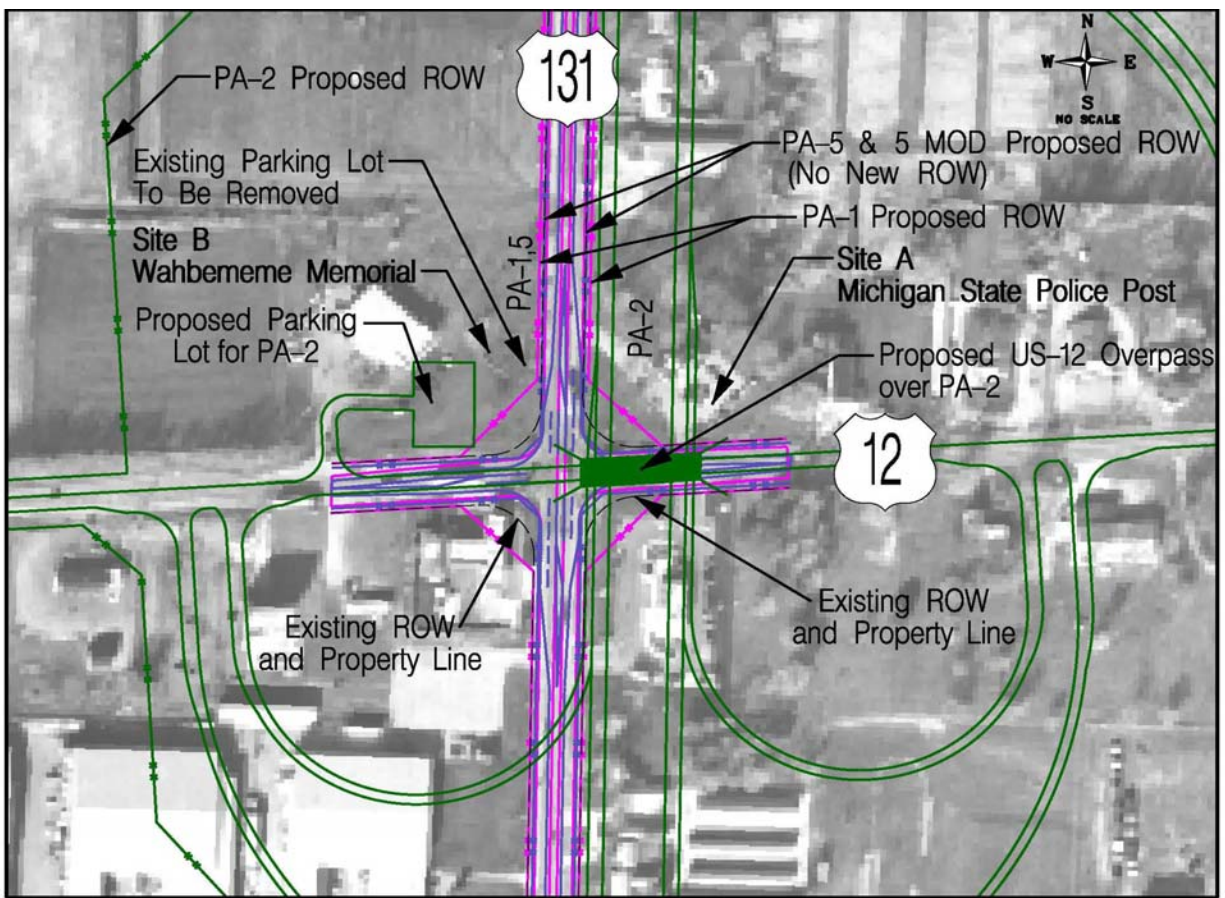


Figure 4.2

Site C - 63280 US-131, Constantine

This farmhouse is located on the west side of US-131 south of Garber Road and is eligible for listing on the NRHP. There are outbuildings associated with the farm, however, they are not recommended for listing. As shown in **Figure 4.3**, PA-1, PA-2, PA-3, and PA-5 follow the same alignment at this location and would have an adverse effect on the property, although the narrower two-lane roadway width associated with PA-5 would result in a marginally lower impact from increased distance and smaller visual intrusion. Noise levels under PA-1, PA-2, PA-3 and PA-5 would be lower than No-Build levels and below NAC criteria. PA-4 is located well west of the property and no impacts are anticipated.

As illustrated in **Figure 4.3**, PA-5 MOD is on the existing roadway alignment and retains two travel lanes. Truck climbing lanes are also proposed in this area. While potential truck climbing lanes would be kept within the existing roadway ROW, the road would be closer to the farmhouse and result in an increase of noise levels at the house. Noise levels under PA-5 MOD would be slightly lower than under the No-Build alternative, although they would exceed the residential NAC.

The new highway facility under PA-1, PA-2, PA-3 and PA-5 would cross directly over the property and pass just west of the farm outbuildings. No structures would be removed, but visual impacts would also occur to this property. Due to the significance of this farmhouse and the potential associated impacts, a 4(f) evaluation has been prepared for this property and is included in **Section 5.0, Section 4(f) Evaluation**.

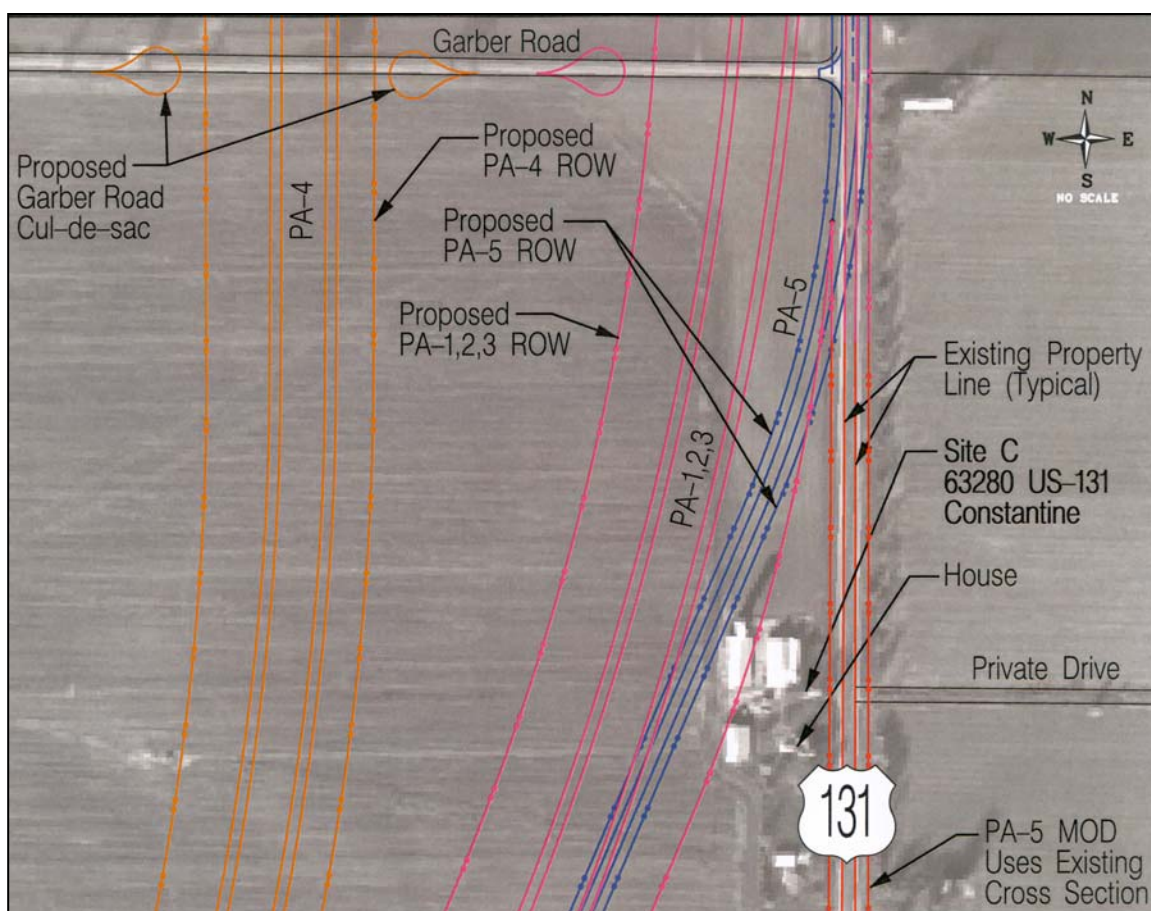


Figure 4.3

Site D - 63000 US-131, Constantine

This farm is located north of Constantine in the northeast corner of US-131 and Withers Road. The federal style house has been recommended eligible for listing on the NRHP. No impacts from PA-4 are anticipated. PA-5 and PA-5 MOD would use the existing US-131 roadway and would not create any direct impacts. PA-1, PA-2, and PA-3 would be located immediately west of existing US-131 at this location, as shown in **Figure 4.4**. No ROW from this property would be required for any of the Practical Alternatives, and as a result, this project would have no adverse effect on the property. A vegetative buffer would be planted between the house and roadway to minimize associated visual and audible impacts.

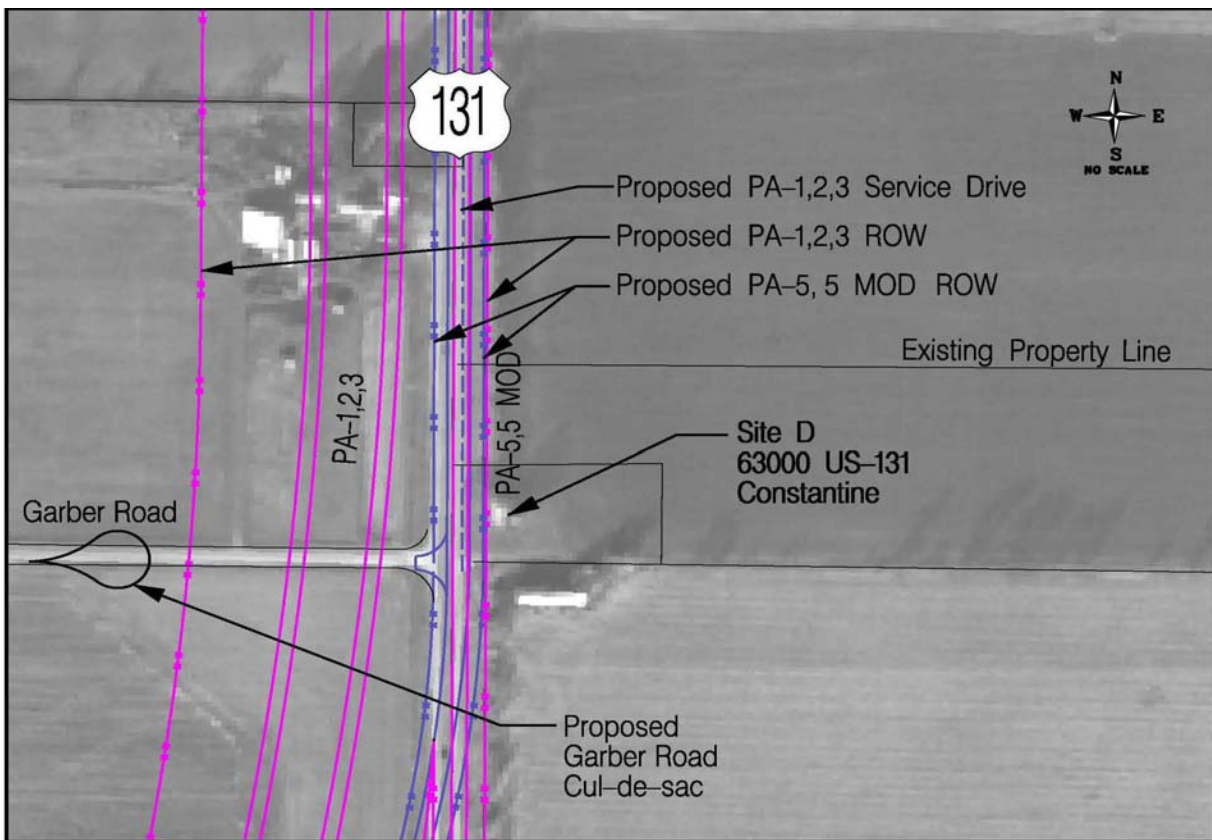


Figure 4.4

Site E - 62249 US-131, Constantine

This farm is located on the east side of US-131 between Withers Road and Drummond Road. PA-4 is located west of the property and would not result in any impacts. As shown in **Figure 4.5**, a service drive would be provided along the new highway facility in front of the farmstead. A new access road would be located on the east and north sides of the property for PA-1, PA-2, and PA-3, and would require new ROW. The ROW needed from this property is all agricultural land and no buildings or structures would be disturbed. However, PA-1, PA-2, and PA-3 would have an adverse effect by introducing a new access road to the property.

PA-5 and PA-5 MOD would keep US-131 on its existing alignment, with two travel lanes, and would not require new access roadways as in PA-1, PA-2, and PA-3 since existing at-grade access to both Drummond Road and Site E would be maintained as it is today. A truck-climbing lane would be provided to handle the steep northbound grade heading towards Drummond Road, but this would be accommodated within existing ROW and would not create any adverse direct impact on Site E.

Due to the significance of this property and the potential associated impacts, a 4(f) evaluation has been prepared for this property and is included in **Section 5.0, Section 4(f) Evaluation**.

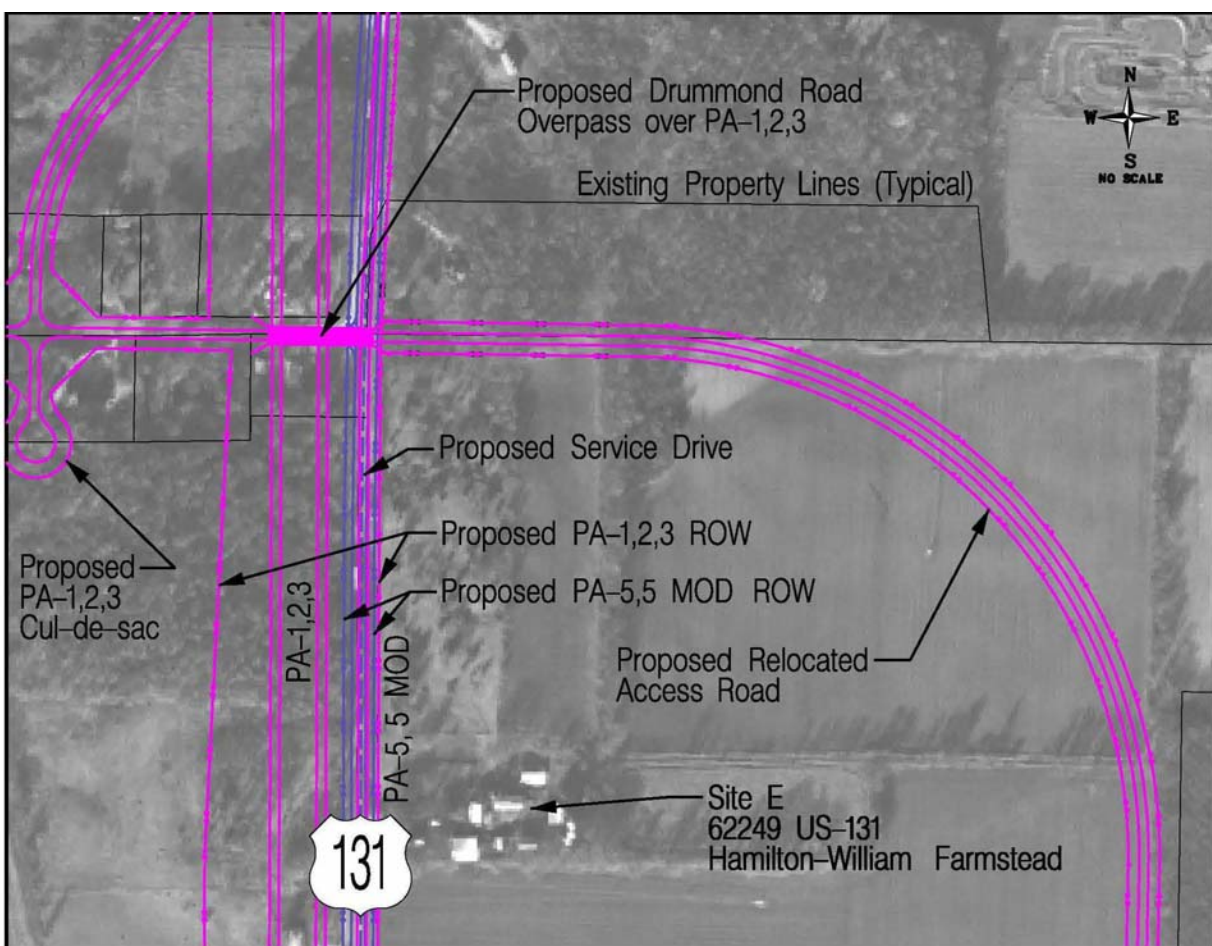


Figure 4.5

Site F – 15303 W. Broadway, Three Rivers

This former farm is located on the south side of West Broadway, west of existing US-131. As illustrated in **Figure 4.6**, PA-1 and PA-3 are located west of the property and would not result in any impacts. PA-5 and PA-5 MOD would follow the existing US-131 alignment east of the shopping center illustrated in **Figure 4.6**; these alternatives maintain existing access at Broadway Road, and would not result in any impacts to Site F. However, the PA-4 alignment is located immediately west of the house and ROW would be required as well as the potential relocation of one structure. PA-4 would have an adverse effect due to relocation of one structure. A PA-2 service drive would be located on the east side of the barn and would require ROW from the property. The PA-2 mainline improvements would have no adverse effect to the structures or historical context of the property because it would use the existing US-131 roadway to the east of the property. Due to the significance of this property and the potential associated impacts, a 4(f) evaluation has been prepared for this property and is included in **Section 5.0, Section 4(f) Evaluation**.

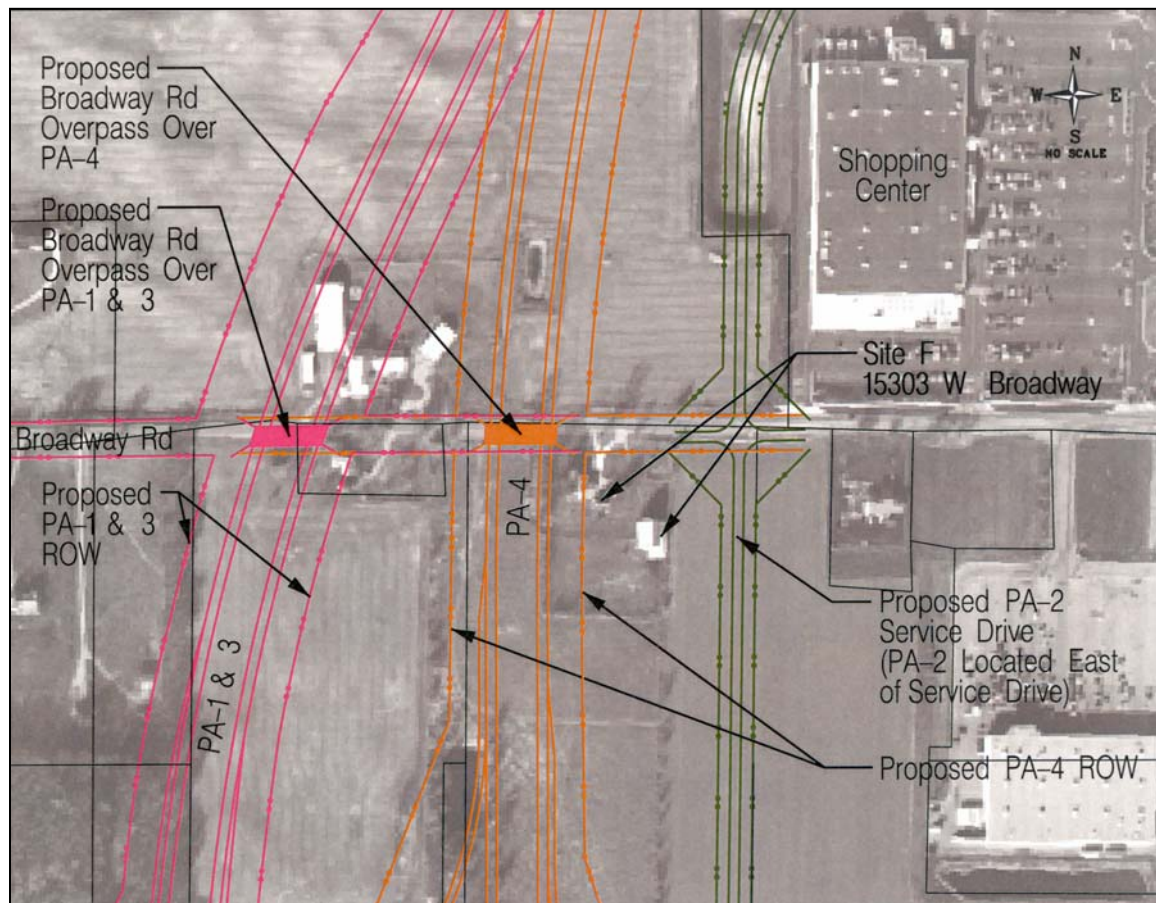


Figure 4.6

Site G – 59019 US-131, Three Rivers

This is a large factory located at the southeast corner of US-131/M-60 and the eastern leg of M-60. No impacts from PA-1, PA-3, or PA-4 are anticipated. As illustrated in **Figure 4.7**, PA-5 and PA-5 MOD would follow the existing four-lane US-131 alignment, maintaining existing vertical and horizontal geometrics and would not result in any impact to the factory building. As illustrated in **Figure 4.7**, PA-2 would require some ROW along the factory's west property line.

Although ROW is required from the factory and the highway facility would be adjacent to the property, the characteristics that qualify the factory for inclusion in the NRHP would not be diminished and the constructive use of the factory would not change. PA-2 would have no adverse effect on the factory because it already is adjacent to US-131, and PA-2 would not alter the current situation significantly. However, 4(f) evaluation minimization measures for this property are suggested for PA-2 in **Section 5.0, Section 4(f) Evaluation**.

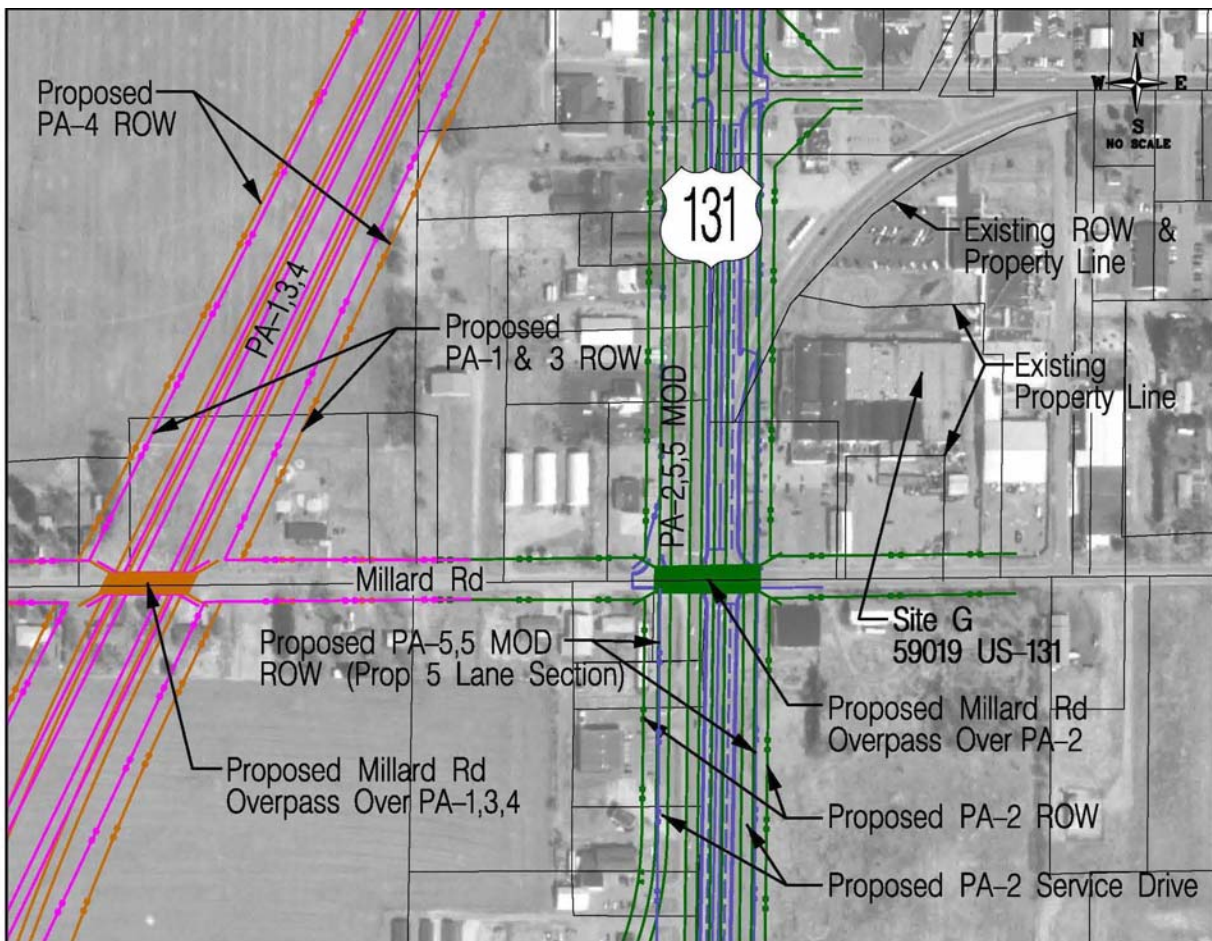


Figure 4.7

4.21.2 Archaeological Resources

A Phase I Archaeological Survey will be completed upon the identification of a Recommended Alternative. The Phase I archaeological survey, including walkover reconnaissance, shovel testing and archaeological deep testing will be carried out for the Recommended Alternative. Phase II archaeological site evaluations, including archaeological test units and/or site stripping will be conducted as necessary on those sites determined to be potentially significant.

Although there are no known archaeological sites within the Area of Potential Effect (APE), there are 211 known archaeological sites in St. Joseph County. These sites have produced evidence for human activity in the area from the Paleoindian period (12,000 years ago) to the recent historical past. Typically, archaeological sites are categorized as pre-contact sites

(12,000 years ago to about AD 1600) or post-contact sites (AD 1600 to AD 1950). The APE may include archaeological sites from either period.

Pre-contact archaeological sites may be found anywhere. Larger pre-contact habitation sites are typically associated with river terraces. Upland sites, however, tend to be small, temporary camps. River terrace sites may also be deeply buried by river sediments (a result of river flooding) whereas upland sites are typically visible at, or near, the ground surface. Post-contact archaeological sites may also be found anywhere, but are most commonly associated with transportation features such as roads or railroads.

As archaeological sites are more easily mitigated and archaeological surveys are highly invasive (especially deep testing) and are a disturbance to those property owners affected, a Phase I archaeological reconnaissance survey will only be conducted for the Recommended Alternative. Deep testing for buried archaeological sites will be conducted at the proposed crossings of the White Pigeon, St. Joseph, and Rocky Rivers. The results of the survey and any required mitigation will be incorporated into the FEIS.

4.22 Parks and Recreation Impacts

There is one recreation site impacted by the potential US-131 improvements. The Chief Wahbememe Memorial Park is a historic resource listed on the National Register of Historic Places. The park is only impacted by PA-2, which would relocate the entrance of the park. Although this impact is relatively substantial, the park will remain and still be accessible to the public. This park is approximately one acre in size and consists of a stone monument, a historical sign, a picnic table, a lawn area fronting on US-131, and a few parking spaces. **Section 5.0, Section 4(f) Evaluation** discusses the park's value as a historic 4(f) resource, along with **Section 4.21, Cultural Resource Impacts**. There are no known 6(f) sites located within the study corridor.

Existing US-131 passes directly west of the Fabius State Game Area, as do each of the Build Alternatives. None of the game area property is directly impacted by the ROW for the Build Alternatives. The game area has limited recreational use and has no developed recreational facilities.

4.23 Potential Contaminated Site Impacts

Database review and field investigations were conducted in both Michigan and Indiana to determine the potential for contaminated soils or groundwater which may impact or be impacted by the proposed project. Sites with potential contamination impacts were narrowed to those within the recommended search distances established by the American Society for Testing and Materials (ASTM). The probable risk posed by all potential contaminated sites within the ASTM search distances were evaluated using a ranking of high, moderate, and low risk values. This risk evaluation was based on the proximity of the site to the proposed alternative, the inherent risk of the site as documented, the presumed direction of groundwater flow, and professional judgment. All sites defined as high risk sites are located either within or immediately adjacent to the proposed ROW for the freeway Build Alternatives. Sites rated as moderate and low risk are found both within the proposed ROW for the Build Alternatives and outside the ROW but within ASTM search distances. Impacted sites that were determined to be of low risk have minimal probability to have impacted the soil or groundwater within the ROW. Risks to human health or the environment are therefore not expected from these sites. None of the Build Alternatives pose substantial site impact risk to the environment. A discussion of the degree of potential risk

posed by each alternative follows. The majority of the environmental risk posed by the freeway alternatives is either low or moderate. Out of a range of 28 to 56 sites found, only one to three sites freeway Build Alternative pose potential high risk. There are no potential high risk sites associated with the non-freeway alternatives. While all Practical Alternatives have potential site impacts, additional testing and possible remediation will be necessary in subsequent phases of this project to ensure that the project does not create any harmful impact from hazardous materials.

Impacts of a No-Build Alternative: The No-Build Alternative would have no impact to existing contaminated sites or sites of environmental interest.

Impacts of PA-1: PA-1 has 45 possible waste sites located within the ASTM recommended search distance. Of the 45 potential waste sites located within the ASTM search distance for PA-1, 20 are located within or immediately adjacent to the proposed ROW. These sites include one State Hazardous Waste Site, nine underground storage tank (UST) sites, four leaking underground storage tank (LUST) sites, three aboveground storage tank (AST) sites, one petroleum pipeline, and two auto/salvage dumps. These sites are listed in **Appendix A.9**. Two of these sites are high risk sites.

The Travel Accessories Manufacturing Company is a state hazardous waste site potentially impacted by PA-1. Soil at this facility has been contaminated with trichloroethylene and benzene, toluene, ethylbenzene, and xylene (BTEX). The health effects of these chemicals are discussed in **Appendix A.9**.

The risk of the Travel Accessories Manufacturing Company has been judged to be moderate. Soil contamination is most likely localized to the immediate facility. Risk to human health of local residents or users of the roadway are therefore minimal. There could be a risk to the health of workers during the construction of the roadway while soil excavation is occurring. This risk can be minimized either through laboratory testing of the soil to determine actual levels and location of soil contamination and by requiring construction workers to use appropriate personal protection equipment during construction. Construction workers should refrain from smoking cigarettes and ingesting food when working within areas that have the potential for contaminated soil, these activities would increase the risk of inhalation or ingestion exposure.

The USTs located within/adjacent to the proposed ROW have a minimal probability to have impacted the soil or groundwater within the ROW. The LUSTs, however, possess a moderate risk to human health and the environment. It is assumed that the LUSTs have resulted in only localized soil contamination from the contents of the tanks. It is most likely that these tanks contained gasoline or fuel oils. These contaminants have the potential to cause health problems to the road construction workers, which is discussed in **Appendix A.9**.

The risk of the facilities which have LUSTs has been judged to be moderate. Soil contamination is most likely localized to the immediate area of facilities. Risk to the health of local residents or users of the roadway are therefore minimal. There could be a risk to the health of workers during the construction of the roadway while soil excavation is occurring. This risk can be minimized either through laboratory testing of the soil to determine actual levels and location of soil contamination and by requiring construction workers to use appropriate personal protection equipment during construction. Construction workers should refrain from smoking cigarettes and ingesting food when working within areas that have the potential for contaminated soil, these activities would increase the risk of inhalation or ingestion exposure.

Two automobile/salvage yards are located within the ROW for PA-1. One has been determined to be a moderate risk because of its smaller size and the second has been determined to be a high risk due to its larger size. Both of these facilities have the potential to have similar impacts and types of soil contamination. Automobile/salvage yards have the potential to contaminate soil with polychlorinated biphenyls (PCBs); lubricating oils; solvents; automobile fluids such as antifreeze and waste oil; heavy metals such as lead, mercury, and arsenic; and asbestos. The effects of these contaminants are discussed in **Appendix A.9**.

Impacts of PA-2: PA-2 has 56 possible sites located within the ASTM recommended search distance. Of the 56 potential waste sites located within the ASTM search distance for PA-2, 19 are located within or immediately adjacent to the proposed ROW. These sites include eight UST sites, four LUST sites, two AST sites, one petroleum pipeline, and one auto/salvage dump. These sites are listed in **Appendix A.9**. Three of these sites are high risk sites.

The USTs located within/adjacent to the proposed ROW have a minimal probability to have impacted the soil or groundwater within the ROW. The LUSTs possess a moderate risk to human health and the environment as discussed for PA-1.

One salvage yard is located immediately adjacent to the ROW for PA-2. It has been determined to be a moderate risk due to its location. The risk associated with this salvage yard would be similar to those for salvage yards under PA-1.

Impacts of PA-3: PA-3 has 34 possible waste sites located within the ASTM recommended search distance. Of the 34 potential waste sites located within the ASTM search distance for PA-3, nine are located within or immediately adjacent to the proposed ROW. These sites include one State Hazardous Waste site, three UST sites, one LUST site, two AST sites, one petroleum pipeline, and two auto/salvage dumps. These sites are listed in **Appendix A.9**. One of these sites is high risk.

The Travel Accessories Manufacturing Company is a state hazardous waste site. Impacts to this site by PA-3 would be the same as those discussed for PA-1.

Two automobile/salvage yards are located within the ROW for PA-3. One has been determined to be a moderate risk because of its smaller size and the second has been determined to be a high risk due to its larger size. Both of these facilities have the potential to have similar impacts and types of soil contamination. The risk associated with these salvage yards would be similar to those discussed for PA-1.

Impacts of PA-4: PA-4 has 28 possible waste sites located within the ASTM recommended search distance. Of the 28 potential waste sites located within the ASTM search distance for PA-4, five are located within or immediately adjacent to the proposed ROW. These sites include one UST site, two AST sites, one petroleum pipeline, and two auto/salvage dumps. These sites are listed in **Appendix A.9**. One of these sites is a high risk site.

Two automobile/salvage yards are located within the ROW for PA-4. One has been determined to be a moderate risk because of its smaller size and the second has been determined to be a high risk due to its larger size. Both of these facilities have the potential to have similar impacts and types of soil contamination. The risk associated with these salvage yards would be similar to those discussed for PA-1.

Impacts of PA-5: Although PA-5 has 42 possible waste sites located within the ASTM recommended search distance, only those located within the recommended search distance on portions of the corridor where ground disturbance would occur are being considered here as much of PA-5 would utilize the existing US-131 ROW (see **Figure 2.3 (sheets 1 and 2)**). When only considering the sites within the ASTM recommended search distance of the bypass portion of the alignment, PA-5 has two sites located within or immediately adjacent to the proposed ROW. These sites include one AST site and one petroleum pipeline.

Both sites were determined to be of low risk and have minimal probability to have impacted the soil or groundwater within the ROW. Risks to human health or the environment are therefore not expected from these sites.

Impacts of PA-5 MOD: Although PA-5 MOD has 45 possible waste sites located within the ASTM recommended search distance, only those located within the recommended search distance on portions of the corridor where ground disturbance would occur are being considered here. Other portions of PA-5 MOD would utilize existing ROW (see **Figure 2.3 (sheets 1 and 2)**). When only considering the sites within the ASTM recommended search distance of the by-pass portion of the alignment, PA-5 MOD has four sites located within or immediately adjacent to the proposed ROW. These sites include two AST sites, one UST site, and one petroleum pipeline.

All of these sites were determined to be of low risk and have minimal probability to have impacted the soil or groundwater within the ROW. Risks to human health or the environment are therefore not expected from these sites.

MDOT would institute mitigation for any impacts from potentially contaminated material. Discussions of this mitigation can be found in **Section 4.30.12, Hazardous/Contaminated Material Mitigation**. MDOT's standard mitigation for contaminated sites would also be instituted. This includes appropriately abandoning all groundwater monitoring wells; evaluation of new utility cuts through contaminated areas (using appropriate backfill where shallow contaminated groundwater is intercepted); and appropriate disposal of contaminated media generated during construction (soil and groundwater). Standard mitigation also includes development of a risk management plan which includes a worker health and safety component.

4.24 Aesthetic and Visual Impacts

Impacts to the aesthetic and visual character of the study area as a result of the Build Alternatives include short-term impacts related to construction, long-term direct impacts, and potential long-term indirect impacts due to induced land use changes. Several parts of the study area, especially those south of M-60 off of US-131, have a distinct rural character. The combination of farmland and rolling hills immediately south of M-60 provides a countryside view for many residents that would be affected to some degree by any Build Alternative. None of the aesthetic and visual impacts would be considered substantial since the character of the rural landscape will not be substantially altered. Any potential impacts would also be mitigated through landscaping and aesthetic treatments. This section discusses aesthetic and visual impacts for the Practical Alternatives from both the "view from the road" and "view of the road" perspective.

Impacts of a No-Build Alternative: The No-Build Alternative would have little impact on the current aesthetic and visual characteristics of the rural and urban areas within the study area. However, the periodic traffic backups along segments of US-131 would remain and continue to

increase. Although there would be no aesthetic or visual impacts from new roadway construction, there may be impacts associated with doing nothing to improve the current conditions. As traffic continues to increase on US-131, the historic downtown area of Constantine would continue to experience considerable commercial through traffic which results in a downtown environment that is aesthetically and visually less appealing to motorists, pedestrians, and business owners.

Impacts of Build Alternatives: The view from US-131 to surrounding locations would not change substantially compared to the No-Build Alternative. Much of the view from the roadway would consist of open agricultural land. The first three miles south of M-60 would feature tree-covered hills as each of the Build Alternatives pass through an area of small rolling hills. A reduction of urban landscape views along the Build Alternatives would occur initially in locations where existing urban areas are bypassed. In the long-term, new development may increase the urban character of the view from the roadway at interchange locations. However, overall views from the freeway Build Alternatives (PA-1 through PA-4) and the Constantine bypass portions of PA-5 and PA-5 MOD would be more rural in nature than those from the current alignment. Open railings on bridges at river crossings would enhance the view of the rivers for users of the Build Alternatives.

During the construction of any Build Alternative, the clearing and filling of ROW, along with the presence of large construction equipment, would cause disruptions to the landscape for neighboring residents, businesses, and traffic, but these would be temporary effects.

Potential long-term impacts of the freeway Build Alternatives on viewers of the improvements would be due to the introduced presence of wider roadways, new bridges, and interchanges in a predominantly rural landscape. Each of the Build Alternatives involves a new crossing of the St. Joseph River. Canoeists using the river and residents living along or near the river west of Constantine would have a new highway bridge interrupting views of a currently unobstructed stretch of river. PA-1 through PA-4 involve the building of a new freeway interchange in the flat rural area around Quarterline Road and Millers Mill Road that would interrupt the rural landscape. New structures for grade separation at local roads would interrupt the view of the rural landscape. PA-5 and PA-5 MOD would construct at-grade intersections in this area, with less of an overall visual effect.

West of US-131, Garber Road rises substantially, giving residents a distant view of the fields to the southeast. All Build Alternatives except PA-5 MOD would run through these fields and would alter this view. The earthwork required to construct each of the Build Alternatives through the area around the current intersection of King Road and US-131 would substantially alter the view of the steep, tree covered hills in that area. At the same time, each of the Build Alternatives would improve the streetscape of downtown Constantine by removing much of the commercial through traffic.

Impacts of PA-1: PA-1 would pass west of the subdivisions off of Coon Hollow Road and change the backdoor view for several residents from an open field to a highway. PA-1 would also involve the construction of an additional bridge over the Rocky River for a service drive. This bridge would interrupt the view of the river for nearby businesses. PA-1 would also include the construction of an interchange in a field near Cowling Road, altering the view for residents of the area.

Impacts of PA-2: PA-2 would involve the relocation of several properties (discussed in **Section 4.5, Relocation Impacts**) along existing US-131 between Indian Prairie Road and Dickinson Road, altering the visual characteristics of that corridor. PA-2 would also involve the creation of

a new interchange at M-60 that would remove the current landscaped intersection that exists today. As PA-2 would be a depressed section through parts of Three Rivers, the view from the highway would be predominantly of retaining walls and not surrounding businesses and residences.

Impacts of PA-3: PA-3 would involve construction along Harrison Road south of Indian Prairie Road and then pass through a forested area east of Stag Lake, thus changing the landscape of the area. PA-3 would have the same visual impacts as PA-1 in the Coon Hollow Road area, including the crossing of the Rocky River, and a new interchange near Cowling Road.

Impacts of PA-4: PA-4 runs parallel to US-131 at the bottom of a broad valley that averages approximately 40 feet in depth in the area around Drummond Road. This would alter views for a few neighboring residents, however, the new roadway would be depressed so as to be less visible from the cross streets at Drummond and Garber Roads. This would also provide a view of the rolling hills from the roadway. PA-4 would have the same visual impacts as PA-1 in the Coon Hollow Road area, including the crossing of the Rocky River, and a new interchange near Cowling Road.

Impacts of PA-5 and PA-5 MOD: PA-5 and PA-5 MOD avoid many of the visual impacts associated with the other Build Alternatives because the facility would generally remain on existing alignment, utilize a two-lane cross section (except where existing US-131 contains a wider cross sections) and maintain at-grade intersections. PA-5 and PA-5 MOD would not create any grade separations or large interchanges. The primary area of impact would be the bypass of Constantine. The primary visual impacts would be created in that bypass, particularly in the vicinity of the St. Joseph River, where a new bridge would be constructed. However, PA-5 and PA-5 MOD would require only a single two-lane bridge and the freeway Build Alternatives would require two parallel structures or one four-lane structure. PA-5 MOD would incorporate a shorter bypass of Constantine. Both of these alternatives would have the effect of increasing traffic along the existing corridor, affecting existing residences. However, traffic in downtown Constantine would decline and create a more visually appealing atmosphere.

Mitigation: Mitigation of aesthetic and visual impacts caused by the Build Alternatives could come in many forms. Natural and man-made barriers can reduce the visual presence of a new highway for nearby residents. Landscaping opportunities would be evaluated during the design process to enhance the visual character for both drivers and those viewing the facility from a distance. Local communities could also adopt uniform standards along the highway for landscaping and signage in order to improve the overall aesthetic value of the corridor. The local communities have the ability to regulate billboards along any Practical Alternative.

4.25 Construction Impacts

Over the long term, the No-Build Alternative would periodically impact motorists, residents, and businesses due to required maintenance on the existing roadway. These impacts would be temporary during the time periods in which the maintenance would occur.

All of the Build Alternatives would have associated temporary and short-term impacts. The transient time and location of construction impacts, along with mitigation that MDOT requires to minimize the disturbance, would avoid substantial construction impacts. It is anticipated that the Build Alternatives would be constructed in phases, localizing the temporary construction disruptions and impacts to the segments being constructed in that phase. Temporary changes to existing travel patterns due to road closures and detours would impact traffic on roadway

segments being connected to reconstructed US-131. While these impacts are considered unavoidable for any of the Build Alternatives, lessening the temporary impacts to motorists, pedestrians, and residents would be a fundamental component of the construction staging and plans for maintenance of traffic during construction. While specific detour routes are unknown at this stage of the study, no lengthy detour routes are anticipated for any of the alternatives. Potential detour routes would vary depending on potential phasing of construction; however, no two adjacent parallel routes would be closed at the same time. No new capacity improvements on local roads are anticipated to accommodate detoured traffic.

4.25.1 Traffic Flow Impacts

Under the No-Build Alternative, impacts to traffic flow would be localized to areas where roadway improvements would need to be made in the future.

In general, Build Alternatives on new alignments would be less disruptive to existing US-131 traffic than reconstruction along the existing alignment. However, temporary interruptions to existing traffic on US-131 and other local roadways would occur with all Build Alternatives. In areas that utilize existing alignments, PA-1 through PA-4 would construct a wider four-lane freeway facility with opportunities for maintaining two travel lanes while two lanes are being constructed. PA-5 and PA-5 MOD would continue to maintain mostly a two-lane facility on the existing two-lane alignment. PA-5 and PA-5 MOD would impact traffic flow during construction where the existing four-lane divided section in Three Rivers is proposed to be converted to a five-lane section. However, there is ample ROW to maintain traffic.

Traffic interruptions would occur at locations where the new or reconstructed roadway connects with existing roadways and where structures and interchanges are proposed in the case of PA-1 through PA-4. At structure locations where Build Alternatives pass over the existing roadway, temporary lane closures and construction equipment access drives would be required. At locations where existing roadways pass over the Build Alternatives, a temporary road closure and detour would be required until the new structure is open to traffic. Traffic detours would result in increased traffic congestion on local roadways, delays, longer trips, and access changes to some commercial and private properties. Changes in access to businesses could potentially affect retail businesses if appropriate mitigation measures are not taken to maintain access to all affected properties. Impacts at the Norfolk and Southern Railroad would vary depending on whether an at-grade crossing (PA-1, PA-5, PA-5 MOD) or a grade separation (PA-2, PA-3, or PA-4) is recommended. The impacts associated with PA-5 and PA-5 MOD would likely be minimal since no widening would be performed in this area.

Mitigation: Temporary disruption of normal traffic patterns would occur at various locations and during different phases of the construction process. Minimizing delays, congestion, and access restrictions would be a priority of the construction process. MDOT would coordinate with local communities and study the residential and commercial traffic in the area to determine desirable detour routes and access for the community, while also maintaining through traffic.

The MDOT *Road Design Manual* guidelines for maintaining traffic, road detours and closures, and staged construction, would be consulted for preliminary determination of best practices. The current edition of the MDOT *Standard Specifications for Construction* presents guidelines for traffic control and maintaining traffic. Coordination with the Norfolk and Southern Railroad would also be required with any alternative that may influence rail traffic.

MDOT would maintain public awareness throughout the project by providing general information, addressing public concerns, and providing specific information such as duration

and location of detours, lane closures, alternative routes, upcoming activities, and anticipated construction deadlines.

4.25.2 Construction Impacts to Businesses and Neighborhoods

The No-Build Alternative would periodically impact businesses and neighborhoods during roadway maintenance and improvements. Any of the Build Alternatives would temporarily disrupt access to some local businesses and neighborhoods. PA-2 would be the most disruptive to business access. All of the Build Alternatives would impact existing neighborhoods due to increased traffic, noise, and congestion.

Mitigation: The contractor would be required to maintain access to businesses at all times to the extent possible. Contractors would coordinate with business owners continuously throughout the project. In neighborhoods being impacted by construction, MDOT and the contractor would coordinate with residents regularly.

4.25.3 Construction Impacts to Emergency Services

The No-Build Alternative would have no construction impacts to emergency service vehicle routes. All of the Build Alternatives would likely impact emergency vehicle routes due to road closures, detours, and temporary traffic congestion/delays.

Mitigation: MDOT would coordinate with emergency service providers prior to the beginning of construction or implementation of new phases of construction. Coordination would be maintained throughout construction. Adjustments to emergency response plans would be developed based on project activity.

4.25.4 Construction Impacts to Surface Streets

The No-Build Alternative would have no construction impacts to surface streets. To a varying degree, all of the Build Alternatives may impact surface streets due to heavy equipment usage, as well as the high volume of commercial truck traffic that may be diverted to non-commercial streets. Deterioration of surface streets could occur during construction in nearby areas as well as along detour routes.

Mitigation: The current edition of the MDOT Standard Specifications for Construction provides guidelines and requirements for contractors to maintain existing surface streets that are used during construction. The contractor would be required to maintain temporary repair of all surface streets that are damaged as a result of being used as a detour or for equipment access. Pre-construction preparation of surface streets may need to be performed in anticipation of heavier volumes of traffic, as well as commercial truck traffic. Upon completion of construction activities, roadway inspections would take place and permanent repairs would be made as necessary.

4.25.5 Construction Noise and Vibration Impacts

The No-Build Alternative would not create any construction noise other than that which is necessary for periodic maintenance of existing roadways. For the Build Alternatives, noise generated by construction operations and equipment would vary greatly, depending on the equipment type and model, mode and duration of operation, and specific type of work in progress. Impacts resulting from construction noise are anticipated to be localized, temporary, and transitory. Construction could create vibrations that would pose a temporary disturbance to

people and animals, and could affect nearby structures. Construction noise and vibrations are more likely to be of concern on those alternatives that follow existing roadway corridors, and have sensitive receptors located in the vicinity. Bypasses and alternatives that do not follow existing roads would use mostly farmland, and would pose few noise and vibration impacts to surrounding sensitive properties.

Mitigation: Construction noise would be minimized by requiring that construction equipment have mufflers, that portable compressors meet federal noise-level standards, and that all portable equipment be placed away from or shielded from sensitive noise receptors, if at all possible.

Care would be taken to prevent vibration damage to adjacent structures. In areas where construction-related vibration is anticipated, basement surveys would be conducted before construction begins to document any damage caused by highway construction.

4.25.6 Construction Water Quality and Resources Impacts

The No-Build Alternative would not create any direct impacts on water quality and water resources. Under all Build Alternatives, surface water quality impacts would be expected from implementing the proposed project as discussed in **Section 4.14, Hydrological Impacts**. However, proper sediment and erosion control would minimize these impacts. Groundwater is not expected to be impacted because appropriate erosion and sediment control measures would be implemented.

Construction-related erosion, siltation, and riverbed disturbance would represent short-term effects of the proposed project. Increases in sedimentation and turbidity levels of surface waters would occur during construction relative to the proximity of the excavated areas to surface water and the frequency of storms. However, these are temporary in nature.

Mitigation: Impacts would be minimized in each respective state by proper application and strict enforcement of erosion control measures specified in MDOT's *Soil and Sedimentation Control Manual* and INDOT's standard erosion control procedures.

MDOT's soil erosion and sediment control plan is on file with the MDEQ. MDEQ requires notification of construction and a provision of a certified stormwater operator for inspections is required by MDEQ.

The Build Alternatives would result in the disturbance of one or more acres of total land area. Accordingly, a National Pollution Discharge Elimination System (NPDES) permit for storm water discharges from the construction site would be required.

Further details on mitigation efforts to control soil erosion and sedimentation are located in **Section 4.30.7, Soil Erosion and Sedimentation Control Mitigation**.

4.25.7 Construction Air Quality Impacts

The No-Build Alternative would have no construction impacts to air quality. All of the Build Alternatives would have a temporary air quality impact due to construction equipment pollutants, traffic emissions, and dust from areas where soil is exposed or traveled on by construction equipment.

Mitigation: Measures to reduce impacts to air quality would be taken in accordance with local, state, and federal regulations. MDOT would require contractors to ensure that equipment meets current air emissions standards and is properly maintained to reduce construction equipment impacts. Procedures for reducing dust and particulates would include requiring all trucks hauling dirt and loose materials to be covered, spraying stockpiles and unpaved traveled areas with water, and removing dirt on paved roads as necessary. Further discussion on air quality impact mitigation procedures is located in **Section 4.30.19, Control of Air Pollution During Construction.**

4.25.8 Disruption of Utility Services

The No-Build Alternative would not affect water, sanitary sewer, gas, telephone, or electrical transmission lines other than temporary maintenance activities. The Build Alternatives all would likely affect such utilities that are adjacent to or crossed by the project. Even if utilities do not require permanent relocation or adjustment, service to the project area may be temporarily interrupted during the adjustment period. For the most part, the effects of this work would go unnoticed.

American Electric Power (AEP) owns and operates a hydroelectric dam on the St. Joseph River in Mottville Township. The impoundment for this dam stretches upriver from Mottville Township and includes the section of the river where the proposed Build Alternatives would cross. These impoundment areas are owned in fee simple by AEP and therefore would require a property conveyance for any proposed crossing. If these lands are subject to a Federal Energy Regulatory Commission (FERC) license, a review would be needed for conveyance.

Mitigation: MDOT and its contractors would coordinate with the utilities and affected communities prior to beginning construction or implementation of new phases. The coordination would be maintained throughout the project.

4.25.9 Visual Impacts from Construction Activities

For residences and businesses located near the project area, there would be temporary visual impacts associated with construction work, particularly from earthwork operations, storage of materials/equipment, and removal of structures.

Mitigation: MDOT's contractors would be required to maintain and restore all haul roads, work areas, and storage yards to minimize visual impacts. Staging of construction activities would help to minimize the duration of impacts to individual neighborhoods.

4.26 Indirect and Cumulative Impacts

Indirect impacts are caused by an action and are realized later in time or further removed in distance but are still reasonably foreseeable (40 CFR 1508.8). Cumulative impacts are "impacts which result from the incremental consequences of an action when added to other past and reasonably foreseeable actions" (40 CFR 1508.7). Indirect and cumulative impacts resulting from the construction and subsequent improvements of US-131 would add to any impacts resulting from present and future infrastructure improvements within the study area. The construction of US-131 and its successive improvements have over time attracted developments within sections of the corridor. These developments resulted primarily in the conversion of farmland to commercial uses which have increased the tax and economic base of the communities.

The following section discusses the indirect and cumulative impacts likely to result from the Build Alternatives within four major categories: land use and development, agriculture, wetlands and natural areas, and transportation patterns. Indirect impacts are most likely to occur due to the development of some highway-oriented businesses at new interchanges or intersection locations. Cumulative impacts are less likely to result from the Build Alternatives as there are no other major public developments currently planned for the study area and known future private developments are relatively minor. It should be recognized that both indirect and cumulative impacts can come from the effects of improving US-131 in conjunction with other development actions performed by a range of actors: MDOT (other state highways), other highway agencies (Indiana DOT, County/Local highway departments), institutional developers, private developers, etc.

Land Use and Development: Ultimately, communities have control over their future development patterns through land use plans, zoning ordinances, and agreements with neighboring jurisdictions. The study area communities may adopt new planning initiatives to control potential growth caused by the development of project alternatives. Unplanned and uncoordinated development can create excess demand for community resources and infrastructure.

Development is likely to occur within most of the study area communities regardless of the location or type of facility chosen for US-131. Most of the study area communities are forecast to have slow to moderate population growth over the next 20 years (refer to **Table 3.1 in Section 3.3.1, Population**). Between January 1992 and January 2002, the labor force in St. Joseph County increased by 19.9% (Michigan Department of Labor). Under a No-Build Alternative, this should result in minor new residential, commercial, and industrial development as suitably zoned and serviced (water, sewer etc.) vacant land exists to handle such growth. Growth in the study area is currently mixed, as illustrated by the presence of both vacant and newly opened businesses.

The Build Alternatives should have little effect on existing development plans with the exception of PA-2, which relocates 64 commercial sites, including 14 vacant commercial sites, and may cause new or expanding businesses to seek alternative sites within or outside of the study area communities.

For PA-1, PA-2, PA-3, and PA-4, indirect impacts resulting from new highway-induced development would likely be focused at the intersections/interchanges between these alternatives and major local roads or State/U.S. highways (US-12, Quarterline Road/Youngs Prairie Road, M-60, Cowling Road). PA-5 and PA-5 MOD would be expected to have a much lower influence on new highway-induced development because most of the corridor would remain on existing US-131 ROW (See **Figure 2.3 (sheets 1 and 2)**).

PA-3 and PA-4 may encourage new development between the existing US-131/US-12 intersection and the US-12 interchanges for those alternatives. Similar new development may occur between the PA-1, PA-3, and PA-4 interchanges at M-60 and the existing US-131/M-60 intersection.

The PA-1, PA-2, and PA-3 interchanges at Quarterline Road and the at-grade intersection of Quarterline Road with PA-5 would not be expected to encourage much new commercial development west of Constantine as Quarterline Road allows for a direct connection to existing commercial properties along US-131 in downtown Constantine. A housing development is under construction near North River Road, south of the proposed interchange/intersection at

Quarterline Road and is expected to continue irrespective of any roadway construction. The PA-4 interchange at Youngs Prairie Road does not have direct access to the existing commercial properties along US-131 in downtown Constantine and may encourage some conversion of residential land and/or existing structures to in home business or other commercial uses.

As with PA-1 through PA-4, the bypass of Constantine in PA-5 and the shorter bypass of Constantine in PA-5 MOD would offer opportunities for commercial or residential development on property that is less readily accessible today. Intersections with Riverside Drive, North River Road, and Quarterline Road, which would accommodate property access, would likely be the focus of any PA-5 or PA-5 MOD indirect development. All other local roads feature cul-de-sacs along the off-existing alignment portions of PA-5 and PA-5 MOD.

The limited/controlled access portions of the Build Alternatives are unlikely to encourage new development along US-131 in locations where no development exists today. The freeway access limitations of PA-1 through PA-4 and the restriction of driveway access on the Constantine bypass portions of PA-5 and PA-5 MOD would likely confine development. The relatively small population of the study area is likely to limit interchange-related development (under PA-1 through PA-4) or development on crossroads near at-grade intersections (under PA-5 and PA-5 MOD) to service stations or other small franchise operations serving both local and through traffic consumers. Development would also be limited by the availability of appropriately zoned and serviced land at several of the interchange locations and crossroads.

The Village of White Pigeon is encouraging commercial and industrial development on US-131 south of US-12. The Michigan Economic Grant program awarded a half million dollars in 1999 to the Village which has since expanded its water system along US-131 south to Indian Prairie Road, with plans to expand it north to Dickinson Road. There has been preliminary consideration for a large industrial office facility south of US-12 near the State Line. There has also been recent expansion of a grain transfer facility located west of US-131 on Anderson Road to include a five-acre stone offloading facility. Residential development is expected to occur on the east side of US-131, north of US-12, and the existing modular home community north of US-12 has proposed expanding from 50 homes to approximately 200 homes.

Each of the Build Alternatives reduces through traffic in downtown Constantine and should result in a more attractive downtown due to reductions in through traffic. This may provide an opportunity for the development of new locally-based businesses and potential residential development along Washington Street (existing US-131) in downtown Constantine.

The Village of Constantine has been planning for downtown revitalization, which could encourage redevelopment of the existing commercial areas. The existing industrial base within Constantine is expanding and new industry is expected by the village due to the attractive proximity to railroad access, I-80/90 to the south, and I-94 to the north. Potential residential development could occur due to the construction of a new high school, and the refurbishment of two other schools in the district.

The City of Three Rivers commercial and industrial areas were primarily developed in the late 1990s and early 2000s. Existing industrial areas could be expanding along with the development of a new industrial park on M-60 near Hoffman Road. Commercial areas continue to develop and local officials have indicated the possibility of the development of additional big box retail stores. There are known expansion plans for a motel, an automobile dealer, and a major manufacturer. The Downtown Development Authority (DDA) has expanded the DDA district to attract more retail stores and to increase city revenues. The DDA has plans to

improve the streetscape to make the downtown area more attractive. Plans for residential development include two single-family home subdivisions, two large apartment complexes, and two senior living developments.

Continued cumulative impacts of past, present, and future development and infrastructure improvements within the study area should not be significant. Following the development of an uncontrolled access bypass of US-131 in Three Rivers, there was a localized increase in development adjoining US-131 which resulted primarily in the conversion of farmland to commercial uses. However, the overall study area continues to maintain its rural character. The US-131 road frontage in Three Rivers is mostly developed at this time and PA-1 through PA-4 are proposed to be a limited access facility which would not have the same attraction to retail and service business and would not contribute to a significant cumulative increase in development impacts. An access management plan for St. Joseph County could have the effect of consolidating driveway access for PA-5 and PA-5 MOD in this area, but would not likely offer any impetus for increasing development.

The cumulative impacts from an increase in pavement affecting runoff into water bodies between forecast developments and improvements to US-131 should be minor. The interchanges in Constantine and Three Rivers may continue a cumulative pattern of new residential development occurring west of the existing development. These areas contain a few of the newer small subdivisions within the study area.

Agriculture: Some additional conversion of agricultural properties along US-131, US-12, and M-60 is likely to occur under a No-Build Alternative. The Build Alternatives have interchanges (in the case of PA-1 through PA-4) or new at-grade intersections (for PA-5 and PA-5 MOD) on agricultural land and a somewhat greater amount of new development would likely take place on existing farmland. While the impacts are notable, each of the Practical Alternatives would directly impact less than one quarter of one percent of the total farmland in St. Joseph County. Although the overall farmland impacts from the Build Alternatives are not significant from a county-wide perspective (as discussed in **Section 4.2, Farmland Impacts**), these impacts add slightly to a cumulative pattern of conversion of farmland to other uses in St. Joseph County and across Michigan.

Wetlands and Natural Areas: All of the Build Alternatives directly impact a number of acres of wetlands or other natural areas as detailed in **Section 4.12, Wetland Impacts**. Indirect development encouraged by building new freeway interchanges may further impact wetlands or habitat. Permits are required for impacts to wetland areas, however, these permits are commonly granted for smaller acreage amounts. Overall indirect development impacts to wetlands and natural areas are not expected to be significant. For PA-1 through PA-4, all interchanges were intentionally located within or in close proximity to developed areas to assist in containing any new freeway development away from wetland areas and adjacent to the existing core business area. PA-5 and PA-5 MOD would limit most of the improvements to the existing US-131 ROW, and would also contain any new development away from wetland areas.

The introduction of a new crossing over the White Pigeon River under PA-3 and PA-4 may encourage some potential future growth west of the existing US-131/US-12 intersection. This could result in indirect impacts to high quality wetlands. PA-2 would displace multiple businesses at the existing US-131/US-12 intersection, resulting in indirect impacts at this location from businesses relocating on US-12 adjacent to the White Pigeon River.

Habitat within the White Pigeon River floodplain may be capable of supporting the species listed in **Section 3.20, Threatened and Endangered Species**. The potential for impacts to listed

species may increase if developmental pressures escalate in the area. Although the floodplain proper would not likely be developed, adjacent developmental pressures could impact the habitat for these species.

The Constantine area interchange/intersection with Quarterline Road is located on farmland for all Build Alternatives. There is a wetland complex located southwest of this crossing that could be affected if development takes place on the west side of the Quarterline Road crossing.

Potential impacts to wetland habitat near the M-60 intersection may occur under the No-Build Alternative. Commercial growth in this vicinity has encroached upon wetland areas in recent years. Continued slow to moderate growth can be expected to continue in this area regardless of the alternative chosen. Therefore future wetland habitat impacts are likely with both the Build and No-Build Alternatives. The wetlands in this area are of low to moderate quality.

The Rocky River floodplain is located outside of the study area approximately 500 feet from the proposed Cowling Road interchange for PA-1, PA-3, and PA-4. Wetlands connected with the Rocky River floodplain would potentially be affected if development were to occur west of this interchange. However, most development is anticipated to occur on the east side of the proposed interchange towards existing US-131 and the City of Three Rivers.

Other Transportation Facilities: Improvements to US-131 would have indirect impacts on other transportation facilities within the regional transportation network. Through provision of a better north/south link, a limited amount of traffic would reroute from other north-south routes like I-69. This impact is discussed in greater detail in the **Traffic Report** summarized in **Appendix A.1**. The proposed US-131 alternatives would not attract a large proportion of existing or forecast traffic off any one of the alternate routes.

Cass County Road 17, approximately 12 miles west of the study area, between the Indiana Toll Road and US-12, was recently constructed and opened in 2002. Cass County Road 17 was built to serve local residents in Cass County, especially workers living in Michigan and working in Indiana. Cass County Road 17 may serve some similar traffic as US-131, but it does not provide the same connection between the Indiana Toll Road and I-94, I-96, and other freeways as does US-131. Thus, improvements to US-131 would complement the construction of Cass County Road 17 in improving the regional transportation network rather than competing with it.

Indiana DOT has a long range plan vision for the development of SR 13 and US-131 in their 2025 Transportation Plan. This corridor is proposed to be developed as a statewide mobility corridor extending eastward on US-20 in the Middlebury area and swinging north on SR-13 to connect to US-131. Indiana DOT envisions developing this corridor as a limited access facility for higher speed long-distance trips. While Indiana has identified this corridor as being desirable for future improvement independent of the Michigan DOT's efforts, the US-131 improvement would have a cumulative effect of increasing the scale of the transportation network in this bi-state region.

Mitigation: Local communities would have the option of controlling any highway-induced development caused by improvements to US-131 through local planning initiatives and decisions on extending municipal sewer and water services. Indirect impacts to wetlands and other natural areas would be limited by the extent that any development is allowed to take place by local officials and by applicable regulations and permit requirements. The cumulative impacts to agricultural land would be minimized to the extent possible in the development of final right-of-way plans for the Recommended Alternative.

4.27 Permits

Michigan rules governing permit requirements and issuance are regulated pursuant to the Natural Resources and Environmental Protection Act, 1994 P.A. 451, as amended. The Michigan Department of Environmental Quality (MDEQ), Land and Water Division, Transportation and Flood Hazard Management Unit, regulates activities within a floodplain/floodway, wetland, or below the ordinary high water mark, under the following Parts of the Act:

- Part 301, Inland Lakes and Streams
- Part 303, Wetlands Protection
- Part 31, Floodplain Regulatory Authority

A permit would be required for all of the Build Alternatives due to the impacts to wetlands. The U.S. Army Corps of Engineers (USACE) has the authority to regulate activities within waters of the United States under Section 404 of the Clean Water Act (33 U.S.C. 1344). In 1984, Michigan received authorization from the federal government to administer Section 404 of the Federal Clean Water Act in most areas of the state (Part 303, Wetlands Protection). All wetland impacts would occur within the State of Michigan.

No waterways or wetlands have been identified in the Indiana portion of the study area. As a result, no permits would be required for any waterway or wetland impacts. However, general permit 327 IAC 15-5 (Rule 5) would be required from the Indiana Department of Environmental Management for any construction activity (which includes clearing, grading, excavation and other land disturbing activities) that results in the disturbance of five acres or more of total land area.

In recognition of the duplication of state and federal regulations, a “Joint Permit Application” is used by MDEQ to enhance the understanding of the permit requirements of the state and federal laws for construction activities where the land meets the water, including wetlands. Wetland impacts for the Practical Alternatives range from 0.5 acres to 58 acres, and are discussed in **Section 4.12, Wetland Impacts**. Wetland impacts would be mitigated at approved wetland mitigation sites as discussed in **Section 4.30.4, Wetland Mitigation**.

The Practical Alternatives cross the White Pigeon River, the St. Joseph River, and the Rocky River. PA-1, PA-5, and PA-5 MOD would utilize the existing structure over the White Pigeon River, whereas PA-2, PA-3, and PA-4 would use a new crossing. All new river crossings would be evaluated and approved as part of a “Joint Permit Application” with MDEQ (Part 31, Floodplain Regulatory Authority, and Part 301, Inland Lakes and Streams).

Construction activities that disturb one or more acres of land and have a point source discharge of storm water to waters of the state are required to obtain permit coverage (Rule 2190 of Part 31 of Act 451) from the MDEQ, Water Quality Division.

A Soil Erosion and Sedimentation Control Plan would be developed for the Recommended Alternative. Temporary measures such as geotextile silt fences, check dams, and sediment traps and basins would be specified for controlling erosion and sediment transport during construction. MDEQ may audit the MDOT sedimentation and control plan to ensure compliance with Part 91 of PA 451 of 1994 for Soil Erosion and Sedimentation Control. MDOT is not required to obtain individual soil erosion and sedimentation control permits for this project, as it

is an authorized public agency. The approved Soil Erosion Control Program and Standard Plan on file with the MDEQ would be followed.

A Notice of Coverage of Part 31 would be submitted for the construction activities under the National Pollution Discharge Elimination Permit (Part 31 of PA 451).

Sites regulated by the Federal Resource Recovery Act of 1976, the Michigan Hazardous Waste Management Act (PA 1979, Number 64, as amended), or the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 would require permits. Soil testing would be conducted prior to any construction work at sites of environmental contamination to determine the extent, significance of impacts, and permit requirements. To control local air pollution impacts, a permit would be required from the MDEQ Air Quality Division for portable bituminous and concrete plants used during project construction.

4.28 Irreversible or Irretrievable Commitments of Resources

Irretrievable commitments of the No-Build Alternative include the money, time, and personal hardship related to the decreasing Level-of-Service (LOS) to motorists anticipated on existing US-131. As LOS deteriorates over time, there would be increasing costs for energy and the time required for business travel and personal driving. As traffic delay and operational inefficiencies increase, air pollution, noise pollution, and crash incidents would affect the local environment to a greater extent than exists today.

Implementation of the Build Alternatives involves the commitment of a range of natural, physical, human, and fiscal resources. Land used for construction of the proposed improvements is considered an irreversible commitment during the time period that the land is used for a highway facility. For ROW, land resources would be committed from natural, agricultural, residential, and commercial areas. However, if a greater need arises for use of the land or if the highway facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion would ever occur.

Construction of any Build Alternative would utilize considerable amounts of fossil fuels, labor, and construction materials such as cement, aggregate, and bituminous materials. Such a resource use would be generally irreversible although it would be possible to retrieve and reuse these resources to a limited extent. Any construction would also require a substantial one-time expenditure of both state and federal funds which are irretrievable.

The commitment of these resources is based on the concept that residents in the local communities, the states of Michigan and Indiana, and the Midwest would benefit from the improved quality of the transportation system.

4.29 The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

Any Practical Alternative would involve short-term and long-term tradeoffs. The fiscal goal of any roadway improvement is that the ultimate benefit should justify the initial expenditure. In the context of this discussion, "short-term" refers to the immediate direct consequences of the project while "long-term" refers to its direct or indirect effects on future generations.

Short-term consequences to the environment resulting from the Build Alternatives have been discussed throughout **Section 4.0, Environmental Consequences** and could include:

- Temporary air, noise, water pollution, and visual effects caused by construction
- Increased cost to motorists in time and fuel efficiency because of construction
- Disturbances to businesses, homes, and institutions because of construction
- Conversion of open space, agricultural land, parks, woodlands, and wetlands to transportation usage
- Relocation of people and businesses, including expenses that would be incurred as these people are compensated
- Reduction in property tax revenues resulting from relocation of people, businesses, and farms, and
- Use of public funds to build the highway

Most of the long-term benefits which may be realized from improvements to US-131 are addressed in **Section 1.0, Purpose of and Need for a Proposed Action**. These long-term benefits would include:

- Improved access to the region and greater connectivity with the rest of the major highway system serving southwestern Michigan and northern Indiana
- Improvements in motorist convenience, safety, travel time, and energy use
- reduction of the adverse impacts of US-131 within the Village of Constantine due to through traffic and the high volume of commercial vehicles
- Increased economic development opportunities, and
- Reduction of air pollution and noise due to improved traffic flow

The implementation of phased improvements to US-131 that result in the ultimate build-out of the Recommended Alternative within the study area is consistent with the long range transportation plans of MDOT.

4.30 Mitigation Summary

The goal of mitigative measures is to preserve, to the greatest extent possible, existing neighborhoods, land use, and resources, while improving transportation. Although some adverse impacts are unavoidable, the Michigan Department of Transportation (MDOT), through the route location, design, environmental, and construction processes, takes precautions to protect as many social and environmental systems as possible. Construction activities that include the mitigation measures described below are contained in the current Michigan Standard Specifications for Construction.

The following paragraphs discuss the mitigation concepts that are being considered at this time for the Build Alternatives. Without the benefit of detailed design plans and data, tentative mitigation ideas are proposed as a means to avoid or reduce adverse impacts on identified resources if a Build Alternative is recommended for design and construction. Further agency coordination would continue through the design stage. Design plans would be reviewed by MDOT and INDOT personnel prior to contract letting in order to incorporate any additional social, economic, or environmental protection items. Construction sites would be reviewed to ensure that the mitigation measures proposed are carried out, and to determine if additional protection is required.

More mitigation measures may be developed if additional impacts are identified. Specific mitigation measures would be included on the design plans and permit applications.

4.30.1 Measures to Mitigate Right-Of-Way Acquisition and Relocation Impacts

Compliance with State and Federal Laws: Acquisition and relocation assistance and advisory services would be provided by MDOT in accordance and compliance with Act 31, Michigan P.A.1970; Act 227, Michigan P.A. 1972; the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended; and Act 87, Michigan P.A. 1980, as amended. MDOT would inform individuals, businesses and non-profit organizations of the impact, if any, of the project on their property. Every effort would be made, through relocation assistance, to lessen the impact when it occurs.

Residential: MDOT is required by statute to determine the availability of comparable, decent, safe and sanitary housing for eligible displaced individuals. MDOT has specific programs that would implement the statutory and constitutional requirements of property acquisition and relocation of eligible displaces. Appropriate measures would be taken to ensure that all eligible displaced individuals are advised of the rights and benefits available and course of action open to them.

Business, Farms, or Non Profit Organization: MDOT is required by statute to offer relocation assistance to displaced businesses, farms, and non profit organizations. MDOT has specific programs that would implement the statutory and constitutional requirements of property acquisition and relocation of eligible displaces. Appropriate measures would be taken to ensure that all eligible displaced businesses, farms, or non profit organizations are advised of the rights and benefits available and courses of action open to them. Displaced businesses and organizations would be encouraged to relocate within the same community.

Purchasing Property: MDOT would pay fair and just compensation for fee purchase or easement use of property required for transportation purposes. "Just compensation" as defined by the courts is the payment of "fair market value" for the property rights acquired plus allowable damages to any remaining property. "Fair market value" is defined as the highest price estimated, in terms of money, the property would bring if offered for sale on the open market, by a willing seller, with a reasonable time allowed to find a buyer, buying with the knowledge of all the uses to which it is adapted, and for which it is capable of being used.

Relocation Information: A booklet entitled "Your Rights and Benefits" detailing the relocation assistance program can be obtained from MDOT, Real Estate Support Area, P.O. Box 30050, Lansing, Michigan, 48909 or phone (517) 373-2200.

Property Acquisition Information: A booklet entitled "Public Roads & Private Property" detailing the purchase of private property can be obtained from MDOT, Real Estate Support Area, P.O. Box 30050, Lansing, Michigan, 48909 or phone (517) 373-2200.

Conceptual Stage Relocation Plan: The conceptual relocation plan for this project is attached in **Appendix C**.

4.30.2 Traffic Noise Mitigation

Noise abatement through the use of noise barriers and other mitigation techniques would be considered according to the MDOT noise abatement criteria discussed in **Section 4.10.4, Mitigation of Traffic Noise**. MDOT has defined a six-decibel reduction in the design-hour L_{eq}

noise level as the minimum desired standard for the implementation of noise mitigation to be considered feasible and MDOT considers \$34,200 (2003) or less per residence as the reasonability criteria for the implementation of mitigation measures.

4.30.3 Groundwater Quality Mitigation

Sealing water wells and sewer lines for the protection of groundwater quality is ensured by MDOT specifications imposed on the contractor. Impacts on groundwater resources would be minimized where infringements on wetlands, seeps, and discharge areas is likely to occur. For houses or other structures in urban situations that are relocated or must be razed, sewer lines must be filled with concrete grout at the basement level, and water must be turned off at the street. In rural areas, the sewer line to the septic tank must be filled at the basement level. Abandoned water wells must be filled with cement grout applied from the bottom upwards through a conduit extended to the bottom of the well (in one continuous operation) until the well is filled. The contractor must also meet all local and Michigan Department of Community Health (MDCH) requirements.

Contractors are generally allowed 60 to 90 days following issuance of the demolition contract for the site to be completely cleared. However, only 48 hours is permitted following removal of any structure to fill the foundation to ground level. If the foundation is not filled within this time, MDOT may take independent action to fill the foundation, charging the costs incurred to the contractor. The MDEQ notification procedures for demolitions would be followed.

The above specifications have been approved by the MDCH. The contractor is also referred to the local health department for assistance when special conditions such as flowing wells or wells with a high artesian head are encountered. If high water tables are encountered in cut sections, special methods would be used to reduce any negative effects on the area groundwater. One such method is to raise the road grade.

Drains would be built as necessary along the pavement to drain the roadway subbase. Edge drains are used to intercept horizontal seepage. Stone baskets are used to maintain and reroute the flow of springs when found below the roadway. Intercepted water would be discharged into an available roadside ditch or watercourse. Siltation of watercourses from intercepted water is rare.

4.30.4 Wetland Mitigation

For those wetland impacts that cannot be avoided, MDOT would restore previously existing wetlands or create new wetlands in accordance with Part 303, Section 281.295 of the Wetland Protection Act. The wetland mitigation site will be designed, constructed, and monitored in accordance with MDEQ's *Technical Guidance for Wetland Mitigation* dated September 9, 2003. Wetland mitigation would occur within the St. Joseph River watershed. Preference would be given to mitigation sites that are in the sub watersheds of the White Pigeon and Rocky Rivers to compensate for losses within these sub watersheds. Wetland impacts would be mitigated at a ratio of 2:1 for forested wetlands, and 1.5:1 for emergent and scrub-shrub wetlands. Compensatory mitigation would be in kind; i.e., it would attempt to replace the ecological types and functional values of wetlands impacted.

Although final design would likely result in the further minimization of wetland impacts, preliminary impacts and compensatory mitigation acreages are used for planning purposes at this stage of the project. These preliminary wetland impact calculations and acreages of proposed mitigation for the alternatives are summarized in **Table 4.21**.

Since much of the potential wetland impacts associated with the Build Alternatives would be occurring within the floodplains of the White Pigeon, St. Joseph, and/or Rocky Rivers, a priority was placed on identifying sites within the floodplain or adjacent to floodplain forests located within the project corridor. A second priority was to identify mitigation sites near existing high quality wetlands or significant habitat, in order to increase diversity or expand existing natural systems within the project corridor.

Table 4.21 Summary of Wetland Mitigation

Alternative	Impacts to Floodplain Forests and Forested Wetlands	Proposed Mitigation Acreage Required	Impacts to Emergent, Scrub-Shrub, or Unconsolidated Bottom Wetlands	Proposed Mitigation Acreage Required	Total Proposed Mitigation Acreage Required
No-Build	0	0	0	0	0
PA-1	15.58 ac	31.16 ac	0.66 ac	0.99 ac	32.15 ac
PA-2	19.92 ac	39.84 ac	2.51 ac	3.77 ac	43.61 ac
PA-3	22.47 ac	44.94 ac	0.49 ac	0.74 ac	45.68 ac
PA-4	53.65 ac	107.30 ac	4.22 ac	6.33 ac	113.63 ac
PA-5	0.50 ac	1.00 ac	0.01 ac	0.02 ac	1.02 ac
PA-5 MOD	0.50 ac	1.00 ac	0.01 ac	0.02 ac	1.02 ac

A total of 12 sites were initially identified and studied for their potential to be used for wetland mitigation; five sites are currently being considered. Seven sites were dismissed due to a variety of factors such as adjacent land uses that render the site vulnerable to disruptions, utility easements located within the site, potential disruption to existing hydrology sources, unwilling property owners, etc. The locations of the five sites currently under consideration are shown in relation to the overall study area on **Figure 4.8**. Each of the sites are described in detail in the Draft Technical Memorandum, Potential Wetland Mitigation Sites.

Several of these potential mitigation sites were evaluated by the MDEQ, USFWS, and the USEPA during field visits conducted in August 2001 and May 2002. Information obtained from these resource agencies regarding the desirability of any particular site was incorporated into the site selection process. Further coordination with these agencies will take place as the project develops. If a Build Alternative is selected, assessments regarding the environmental impacts of developing wetland mitigation sites would be conducted on those sites selected for potential mitigation. Assessments would be in compliance with NEPA and would include the evaluation of impacts to historic/archaeologic resources, threatened/endangered species, and potential soil contamination.

Wetland Mitigation Area 1 is the preferred site for compensatory wetland mitigation at this time. **Figure 4.9** illustrates a preliminary conceptual wetland mitigation plan for this site. Area 1 is located just north of the Norfolk Southern Railroad, west of Blue School Road, and adjacent to floodplain forest associated with the White Pigeon River. The entire site consists of

approximately 456 acres, 105 of which appear to have good potential for wetland mitigation. The property owners have expressed their willingness to consider selling their parcels.

Wetland Mitigation Area 1 would provide the opportunity for in kind mitigation for floodplain forest impacts. It possesses soils that are highly desirable for wetland mitigation, and provides the opportunity to create significant wildlife habitat along, and in proximity to, the White Pigeon River. It can also serve as a link or wildlife corridor to Stag Lake, which is less than one mile to the east, enhancing the overall habitat quality of this general area.

Site investigations conducted in April and May 2002 indicated that wetland Mitigation Area 1 has an excellent potential for wetland mitigation. The site is currently utilized for either row crops or is not planted. A ditch system surrounding the agricultural fields is effectively draining this area. The portion of the site which is currently unplanted is dominated by upland plants (*Lanium purpureum*, *Thlaspi arvense*, and *Viola kitaibelliana*).

Soil borings were done during the site investigation and the soil types were confirmed. Soil borings taken to a depth of 18 inches did not encounter saturated soils, confirming that the area is effectively drained. The site would therefore not be considered a jurisdictional wetland despite the presence of hydric soils. The soils consist primarily of Houghton muck, an excellent soil for wetlands. There is a significant topographic change where the Houghton muck soils begin within the agricultural fields.

The wetland area would be planted in native vegetation to match the impacted floodplain forests. The overstory would likely consist of silver maple (*Acer saccharinum*), black willow (*Salix nigra*), and American elm (*Ulmus americana*). The transition zone may contain bur oak (*Quercus macrocarpa*) and shagbark hickory (*Carya ovata*). The understory may contain blue vervain (*Verbena hastata*), Sedges (*Carex spp.*), Joe Pyeweed (*Eupatorium maculatum*), buttercups (*Ranunculus spp.*), blue violets (*Veronica anagallis*), bedstraw (*Galium spp.*), red osier dogwood (*Cornus stolonifera*), and elderberry (*Sambucus canadensis*).

The final mitigation plan would include wetland mitigation in each of the three watersheds by using a combination of the sites shown on **Figure 4.8**. Further investigation is recommended before identifying which potential mitigation sites have the greatest potential for successful wetland restoration or creation to satisfy the overall mitigation requirements. Further coordination with property owners to determine the final acreage available at any particular site is on-going. Studies related to the restoration of hydrology as well as topographic survey would be necessary for design. These studies may consist of the installation of groundwater monitoring wells or hydrologic modeling of surface water under scenarios that either restore historic surface water connections or interrupt drainage ditches that are currently draining a site.

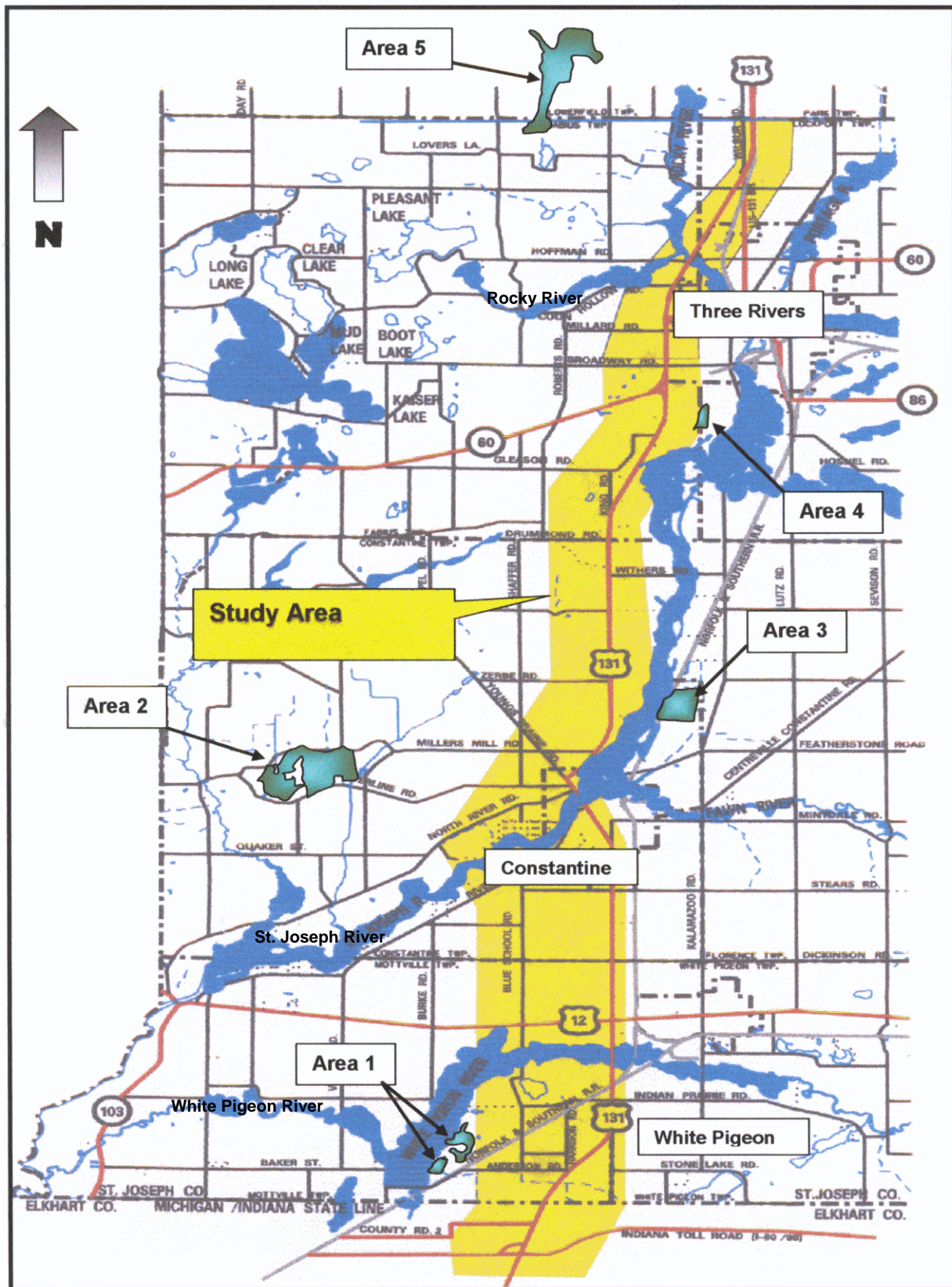


Figure 4.8 Potential Wetland Mitigation Sites

Place Holder for Figure 4.9 Conceptual Wetland Mitigation Plan

4.30.5 Water Quality Mitigation

Adequate soil erosion and sedimentation control measures based on MDOT's approved soil erosion program would be implemented for all Build Alternatives. Vegetation buffer strips would be left in place along both sides of all stream crossings on new alignment, if possible. Highway runoff would be diverted through vegetative controls (grassed waterways) into containment areas prior to outletting into the streams, wherever possible. This would promote infiltration, thereby reducing the potential impact on the streams from added runoff and associated pollutants, including deicing salts, heavy metals, and herbicides.

4.30.6 Floodplain, Stream, and Drain Crossing Mitigation

Bridge and culvert work at river, stream, and drain locations would require construction staging and additional protection items to minimize impacts on the watercourse. The following items are general mitigation items designed to reduce impacts at water crossings. The design plans would show all specific controls for each watercourse.

1. All work below the ordinary high water mark of any river, stream, or drain would require permits from the Michigan Department of Environmental Quality, and/or the U.S. Army Corps of Engineers. All permit conditions would be adhered to during construction. Permit conditions may include fish spawning protection dates where no work can occur in the water unless it is isolated behind a cofferdam installed prior to the start of the protection date.
2. All construction operations adjacent to watercourses would include appropriate temporary and permanent erosion and sedimentation controls (see **Section 4.30.7, Soil Erosion and Sedimentation Control Mitigation**).
3. The contractor may be required to maintain a navigable channel during all phases of the project. During part-width construction operations, the contractor would place signs both upstream and downstream of the construction area that clearly indicates the location of the navigable channel. Navigation access on smaller streams may also be required to accommodate small boat and/or canoe usage. The contractor may be required to provide lighting of barges or other navigation obstructions at night. These efforts will minimize impacts on the three known river events within the study area. These events include the Three Rivers Water Festival, Great Lake Hydroplane Championship, and Modified Hydroplane US Title Series, all of which take place on the St. Joseph River.
4. All construction activities would be isolated from flowing watercourse where possible. This can be done by installing a cofferdam (steel sheeting or sand bags) around the construction area. Another method may be to construct a temporary channel to relocate the existing watercourse while construction takes place at the existing watercourse location. The temporary channel and proposed new channel shall be stabilized prior to water flow being diverted into it.
5. Any channel excavation or riprap placement would be done using part-width construction methods. Work would be done on part of the channel while the water flow is temporarily diverted away from the work area. MDOT has a standard detail showing the temporary water flow diversion that would be included on the design plans for all projects that require in-stream work.

4.30.7 Soil Erosion and Sedimentation Control Mitigation

Accelerated sedimentation caused by highway construction would be controlled before it enters a water body or leaves the highway ROW by the placement of temporary or permanent erosion and sedimentation control measures. MDOT has developed a series of standard erosion control items to be included in design plans to prevent erosion and sedimentation. The design plans would describe the erosion controls and their locations. Payment is made to the contractor for construction and maintenance of items used from this list or items specifically developed for the project.

MDOT has on file with MDEQ an approved operating erosion and sedimentation control program which ensures compliance with Act 451, Part 91 Soil Erosion and Sedimentation Control. MDOT has been designated an "Authorized Public Agency" by MDEQ and is self-regulated in its efforts to comply with Part 91. However, MDEQ may inspect and enforce soil erosion and sedimentation control practices during construction to ensure that MDOT and the contractor are in compliance with Part 91 and the acceptable erosion and sedimentation control program.

The following is a partial listing of general soil erosion and sedimentation control measures to be carried out in accordance with permit requirements.

1. Work would be avoided in the White Pigeon River, St. Joseph River, or Rocky River channels during periods of seasonally high water as much as possible.
2. All road and bridge construction operations would be confined to the existing or proposed right-of-way limits or acquired easements.
3. Road fill side slopes, ditches, and other raw areas draining directly into the White Pigeon River, St. Joseph River, or Rocky River would be protected with riprap (up to three feet above the ordinary high water mark), sod, seed and mulch, or other measures, as necessary to prevent erosion.
4. The surface area of erodible earth material exposed at any one location at one time would be limited to 5000 feet of dual roadway or 10000 feet of single roadway. Once the contractor has final graded and stabilized a section of roadway, additional clearing and grading would be allowed.
5. Areas disturbed by construction activities would be stabilized and vegetated within five days after final grading has been completed. Where it is not possible to permanently stabilize a disturbed area, appropriate temporary erosion and sedimentation controls would be implemented. All temporary controls would be maintained until permanent soil erosion and sedimentation controls are in place and functional.
6. The contractor shall have the capability of performing seeding and mulching at locations within 500 feet of any wetlands, lakes, streams, and drains within 24 hours of being directed to perform such work by the engineer.
7. Special attention would be given to protecting the natural vegetative growth outside the project's slope stake line from removal or siltation. Natural vegetation, in conjunction with other sedimentation controls, provides filtration of runoff not carried in established ditches.

8. The integrity of any agricultural drainage or field tile system encountered would be maintained.
9. The contractor would be responsible for preventing the tracking of material onto local roads and streets. If material is tracked onto roads or streets, it shall be removed.

4.30.8 Existing Vegetation Mitigation

Although some tree removal would be necessary, the existing natural and ornamental vegetative cover would be retained wherever possible within the right-of-way. Where the existing groundcover must be removed, replacement vegetation would be established in a timely manner using seed and mulch, or sod.

Roadside trees adjacent to residences would be saved wherever possible. Where trees are to be removed from in front of residences, property owners would be given appropriate notice, and would be offered replacement trees to help offset the functional or aesthetic loss of the trees.

Replacement tree species, size, and numbers would be determined by MDOT's Region Resource Specialist or the Roadside Development Section following coordination with adjacent property owners. For those owners who request replacement trees, the trees would be placed (with the property owner's approval) on adjacent private property as close to the right-of-way line as possible. Property owners would then assume the responsibility for maintaining these trees.

4.30.9 Wildlife and Migratory Birds Mitigation

Impacts to terrestrial habitats would be minimized during final design through refinements that reduce cross-section widths, maintain existing hydrological conditions, and require construction techniques that minimize the removal of mature trees.

On projects that involve work on structures over watercourses, MDOT reviews potential impacts to migratory birds that may make (or have made) nests underneath the bridges. Coordination between MDOT (Environmental Section and Region Resource Specialist), MDEQ, and U.S. Fish and Wildlife Service (USFWS) would occur on projects where migratory birds, as listed in 50 CFR 10.13, have been identified at specific bridge locations. A "Special Provision" that describes procedures for dealing with migratory birds would be included on these projects. MDEQ permits to work on bridges over watercourses may include specific dates when work on bridges would be prohibited.

4.30.10 Threatened and Endangered Species Mitigation

Coordinated project reviews would be conducted with the USFWS under the provisions of Section 7 of the Endangered Species Act of 1973 and the programmatic consultation guidance for the Transportation Equity Act for the 21st Century, as necessary. These reviews would be done using applicable plans to design projects that avoid or minimize any adverse impacts on federally listed, proposed, and candidate species, and to reduce "incidental take" of these species.

Measures would be set up to isolate and protect any threatened or endangered species located adjacent to any actual construction activities. Protective fencing or other measures would be used to protect threatened or endangered plant species. If the plant species cannot be

protected, individual plants may need to be transplanted or salvaged as required by the MDNR or USFWS requirements.

A list of project specific mitigation for threatened and endangered species habitat potentially impacted by the alternatives is discussed in **Section 4.20, Threatened and Endangered Species Impacts** and the project Mitigation Summary Greensheet.

4.30.11 Cultural Resources Mitigation

Measures to minimize impacts include avoidance, preservation in place, and recordation of the property and structures prior to highway construction. Appropriate mitigation measures would be developed through consultation between MDOT, SHPO, and the property owner. A discussion of potential mitigation of specific cultural resource sites is located in **Section 5.0, Section 4(f) Evaluations**.

4.30.12 Hazardous/Contaminated Material Mitigation

The common hazardous/contaminated sites identified within the project area include underground fuel storage tanks (USTs), leaking underground fuel storage tanks (LUSTs) from former or existing gas stations, former landfills, adjacent salvage yards, industrial or commercial operations, and underground utility pipes or their structural components. Each site of potential surface and subsurface contamination identified was determined to pose a low, moderate, or high risk of involvement for each Practical Alternative. The ranking assigned to each site was based on:

- Distance of the site from each alternative based on American Society for Testing and Materials (ASTM) recommend search distance
- Inherent risk of the site itself [e.g., a Resource Conservation and Recovery Act (RCRA) generator poses a smaller risk than an National Priorities List (NPL) site]
- Presumed direction of groundwater flow based on published data
- Professional judgment

The risk of involvement assigned to each Practical Alternative is a cumulative determination based on the individual risks posed by the sites associated with each of the Practical Alternatives. The “Draft Contaminated Sites and Sites of Environmental Interest Technical Memorandum” prepared for the US-131 Improvement Study details this assignment of potential risk to each Practical Alternative. From information gathered in the technical memorandum it was determined that the Practical Alternatives would not require right-of-way from any site included in the most recent Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) list. The two identified locations designated CERCLIS-NFRAP are “No Further Remedial Action Planned” (NFRAP) sites. They have been removed from the CERCLIS. **Appendix A.9** provides a summary of the technical memorandum for each Practical Alternative.

A Project Area Contamination Survey (PACS) would be conducted in the design phase of the project. The PACS would determine if the known or existing potential sites of environmental contamination would influence the project’s physical design, cost, or design and construction schedule. The PACS would cover existing roadway right-of-way (ROW), and proposed fee ROW, proposed grading permits, and proposed easements of the selected Practical Alternative. The PACS process involves an office review of information from the “Draft Contaminated Sites and Sites of Environmental Interest Technical Memorandum”, prepared for the US-131

Improvement Study, a field site investigation, and a written report of the findings. The written report would delineate the area and depth of contamination expected to be involved, the opinion of cost for remediation and/or mitigation, and the health measures and safety issues applicable. If required, a worker health and safety plan will be prepared prior to construction to reduce dermal exposure and to address direct contact issues.

MDOT would also coordinate with the MDEQ Water Division and Waste and Hazardous Materials Division when excavation or disturbance of bottom sediments is required in areas of known river, stream, or lake bottom sediment contamination. Coordination could include testing of bottom sediments within the project area, reviewing results with the Water Division to determine if any contamination exists, and reviewing results with the Waste and Hazardous Materials Division to determine if any special disposal methods would be required.

If mitigation is required, MDOT's standard mitigation for contaminated sites would be instituted. This includes appropriately abandoning all groundwater monitoring wells; evaluation of new utility cuts through contaminated areas (using appropriate backfill where shallow contaminated groundwater is intercepted); and appropriate disposal of contaminated media generated during construction (soil and groundwater). Standard mitigation also includes development of a risk management plan which includes a worker health and safety component.

4.30.13 Disposal of Surplus or Unsuitable Material

Surplus or unsuitable material generated by removal of structures, trees, peat, etc., must be disposed of in accordance with the following provisions designed to control the possible detrimental impacts of such actions.

1. When surplus or unsuitable material is to be disposed of outside of the right-of-way, the contractor shall obtain and file with MDOT written permission from the owner of the property on which the material is to be placed. In addition, no surplus or unsuitable material is to be disposed of in any public or private wetland area, watercourse, or floodplain without prior approval (and permit) by the appropriate resource agencies and the Federal Highway Administration.
2. Inert debris may be used as a basement fill to a depth not less than two feet below the ground level if the basement is not within the roadway cross-section. Debris used as fill must be covered with at least two feet of clean soil to fill voids. Basement walls are to be removed to ground level.
3. All regulations of the MDEQ governing disposal of solid wastes must be complied with.

4.30.14 Aesthetic and Visual Mitigation

Mitigation of aesthetic and visual impacts could come in many forms. Attractive landscaping along the highway where feasible would enhance its visual character for both drivers and those viewing the facility from a distance. Local communities could also adopt uniform standards along the highway for landscaping and signage in order to improve the aesthetic value of the corridor. All billboards would be required to comply with state and local regulations.

4.30.15 Maintaining Traffic During Construction

Disruption of traffic in the construction area would be minimized to the extent possible. Although control of all construction-related inconveniences is not possible, motorist and

pedestrian safety would be ensured by signing all construction areas. Access would be maintained to properties adjacent to US-131 to the extent possible. Local communities would be consulted in determining detour routes and access for local and through traffic. Coordination with the Norfolk and Southern Railroad would be required for any alternative that may influence rail traffic. MDOT would also coordinate with local business owners, local residents, and emergency service providers as appropriate to ensure access is maintained.

Informing the public of current and upcoming construction/traffic related concerns would be an integral part of the construction process. Public awareness would be maintained throughout the project by providing general information such as addressing public concerns, and providing specific information such as duration and location of detours, lane closures, alternative routes, upcoming activities, and anticipated construction deadlines.

4.30.16 Surface Streets Mitigation

The contractor would be required to maintain temporary repair of all surface streets that are damaged as a result of being used as a detour or for equipment access. Upon completion of construction activities, roadway inspections would take place and permanent repairs would be made as necessary.

4.30.17 Continuance of Public Utility Service

Water, sanitary sewer, gas, telephone, and electrical transmission lines adjacent to or crossed by the project may require relocation or adjustment. If this should be the case, coordination between MDOT and the affected utility company would take place during design, and relocation would take place prior to construction of the road if possible. The contractor would coordinate his construction activities with the affected utility company.

Service to the project area may be temporarily interrupted during the adjustment period. For the most part, the effects of this work would go unnoticed.

4.30.18 Construction Noise Levels and Vibration Impacts Mitigation

Construction noise would be minimized by measures such as requiring that construction equipment have mufflers, that portable compressors meet federal noise-level standards for that equipment, and that all portable equipment be placed away from or shielded from sensitive noise receptors if at all possible. All local noise ordinances would be adhered to.

Where pavement must be fractured, structures must be removed, or foundation piles must be driven, care would be taken to prevent vibration damage to adjacent structures. In areas where construction-related vibration is anticipated, basement surveys would be conducted before construction begins to document any damage caused by highway construction. Identification of properties to be offered basement surveys will be determined during the design phase.

4.30.19 Control of Air Pollution During Construction

The contractor must comply with all federal, state, and local laws and regulations governing the control of air pollution.

Dust Control: During the construction of any project, the contractor would be responsible for adequate dust-control measures so as not to cause detriment to the safety, health, welfare, or comfort of any person, or cause damage to any property, residence, or business.

Bituminous and Concrete Plants: All bituminous and portland cement concrete proportioning plants and crushers must meet the requirements of the rules of Part 55 of Act 451, Natural Resource and Environmental Protection. For any portable bituminous or concrete plant or crusher, the contractor must apply for a permit-to-install or a general permit from the Permit Section, Air Quality Division, of the MDEQ.

This permit-to-install should be applied for a minimum of 30 calendar days prior to the plant being installed for plants with an active MDEQ permit, (or 60 calendar days prior for plants not previously permitted in Michigan).

Dust collectors would be provided on all bituminous and concrete proportioning plants. Dry, fine aggregate material removed from the dryer exhaust by the dust collector would be returned to the dryer discharge unless otherwise directed by the engineer.

4.30.20 Additional Mitigation or Modifications

The final mitigation package would be reviewed by division representatives on MDOT's project study team, in cooperation with concerned federal, state, and local agencies.

Some changes in the early mitigation concepts discussed in this document may be required when design begins or when in-depth soil borings are taken and analyzed. These mitigation concepts would be implemented to the extent possible. Where changes are necessary, they would be designed and field reviewed before permits are applied for and construction begins. Changes may also be necessary during the construction phase, but they would reflect the early mitigation intent. The preceding mitigation concepts are based on the best information available through May 2004.

4.31 Summary Matrix of Impacts of Practical Build Alternatives

The comparative impacts of the Practical Build Alternatives are summarized in **Table 4.22** on the following page.

Table 4.22 Practical Build Alternatives Impacts Summary Matrix

Category	Criterion	No-Build	PA-1	PA-2	PA-3	PA-4	PA-5	PA-5 MOD
Potential Impacts:								
Land Use^A	Total Agricultural (acres) ^B	0	492	512	571	563	109	39
	Unique Farmland (acres)	0	0	0	0	0	0	0
	Prime Farmland (acres)	0	551	481	514	491	109	24
	Farmland Preservation Parcels (#) (acres)	0	11(195)	8(144)	7(242)	8(256)	5(48)	2(15)
	Agricultural Parcel Splits (#)	0	18	10	17	13	5	2
	Non-forest/Undeveloped Land	0	75	49	75	47	6	7
	Land Locked Parcels (#)	0	5	1	5	6	3	0
	Total Right-of-Way Required (acres)^B	0	845	925	878	914	134	59
Social	Recreational Land (acres)	0	0	1 ^C	0	0	0	0
	Neighborhoods/Subdivisions (#)	0	3	2	3	3	2	2
Relocations	Residential Relocations (#)	0	59	110	84	113	8	7
	Commercial Relocations (#)	0	12	64	11	13	1	1
	Community Facilities (Churches, Government Buildings, Schools) Relocated	0	0	2 Churches 1 State Police	0	1 Church	0	0
	Total Relocations	0	71	177	95	127	9	8
Noise	Noise Sensitive Receptors Exposed to Levels Exceeding FHWA Criteria ^D	176	6	10	10	9	14	50
Air			No adverse air quality impacts for any Practical Alternative					
Floodplains/ Stream Crossings	White Pigeon River Length of New/Reconstructed Bridge (ft)	N/A	135	210	160	160	N/A	N/A
	St. Joseph River, Approximate Length of New/Reconstructed Bridge (ft)	N/A	405	405	405	310	405	405
	Rocky River, Approximate Length of New/Reconstructed Bridge (ft) ^E	N/A	110	110	110	110	N/A	N/A
	Total New Stream Crossings (including separate service drive crossing over Rocky River)	0	4	4	4	4	1	1
Ecological Resources^G	Wetlands (acres)	0	16.24	22.43	22.96	57.87	0.51	0.51
	Observed State Threatened and Special Concern Species ^F	0	3	3	3	3	0	0
Cultural Resources	Potentially Historic Sites (#)	0	2	5	2	1	1	0
Contaminated Sites	Potential Contaminated Sites (#)	0	45	56	34	28	2	4
Traffic	Local Roads ending in a cul-de-sac (#)	0	5	6	7	6	5	2
	Grade Separations (#)	0	12	15	15	15	0	0
	At Grade Intersections (#)	0	6	3	3	3	8 ^H	8 ^H
Length	US-131 Mainline Length (miles)	17.2	17.6	17.7	17.2	18.3	17.4	17.6
^A As defined by local land use maps. ^B Does not include indirect farmland impacts from the relocation of farm buildings, as discussed in Section 4.2, Farmland Impacts . ^C Chief Wahbememe Memorial Park. ^D Defined as having design hour exterior noise levels approaching or exceeding FHWA noise abatement criteria (NAC). MDOT defines the NAC as 66 dBA for Residential Uses (Category B) and 71 dBA for Commercial or Industrial Land Uses (Category C). The figures above are projected for Category B in the year 2025. ^E Approximate length of single structure over both Hoffman Road and the Rocky River. ^F Prothonotary Warbler (State Special Concern), Yellow-Throated Warbler (State Special Concern), and Eastern Box Turtle (State Special Concern). No state or federally threatened or endangered species were observed within areas of potential ROW. ^G Does not include Archaeological Impacts, if any, as discussed in Section 4.21.2 . ^H New/modified intersections only. Does not include existing at grade intersections to remain. ^I Cost estimates include early preliminary engineering, preliminary engineering, construction engineering, pavement, earthwork, structures, and right-of-way.								

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Placeholder for Section 4.32 US-131 Special Mitigation Summary (Green Sheet)